AD No.
AD735754

TISA PROJECT REPORT NO. 29
TASK 03/005

Extra-Library Information Programs in Selected Federal Agencies

DDC
RECEIVED
JAN 26 1972
C

O. B. CONAWAY, JR.
NATIONAL ACADEMY OF PUBLIC ADMINISTRATION

SEPTEMBER 1970

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
Springfield, Va. 22151

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

PREPARED FOR OFFICE OF THE CHIEF OF ENGINEERS
DEPARTMENT OF THE ARMY

FORRESTAL BUILDING
WASHINGTON, D.C., 20314

ATTN: DAEN-ASI

109

EXTRA-LIBRARY INFORMATION PROGRAMS IN SELECTED FEDERAL AGENCIES

By

O.B. Conaway, Jr.

With the advice of a panel

Allen V. Astin
Lee G. Burchinal
Verner W. Clapp
Henry J. Dubester
Paul Howard
Charles A. Mosher
Elmer B. Staats
Henry Voos

Report of the National Academy of Public Administration

to

The U.S. Army Corps of Engineers, and
The Federal Library Committee, Task Force on the Role of Libraries and Information Systems

SUMMARY

A major purpose of the National Academy of Public Administration is to advance the science, processes, and art of public administration. One phase of its activities is the use of an expert, under the general guidance of a panel of skilled public administrators, to examine a specific type of administrative development, in search of improvements applicable to the particular area or capable of transfer to other areas.

The present volume was prepared in that fashion. The Academy was requested to make a study of Extra-Library Information Programs in Selected Federal Agencies by the Task Force on the Role of Libraries and Information Systems of the Federal Library Committee. Financial support was provided by the Council on Library Resources and the United States Army Corps of Engineers. The Academy selected Dr. O.B. Conaway, Jr., Benedum Professor of American Government and Administration and Director of the Bureau for Government Research, West Virginia University, as director of the study. He was assisted by a Panel appointed by the Chairman of the Academy, the members of which are identified on pages 3 and 4 of the study. The Academy wishes to express its appreciation to these persons for their assistance as well as to numerous others who gave generously of their knowledge and time, and without whose assistance the study could not have been completed. These include the chairman and the members of the Federal Library Committee, the chairman and members of the Federal Library Committee's Task Force on the Role of Libraries and Information Systems, members of the staff of the Army Office of Research, directors and staff members of the extra-library information programs studied, librarians and other officials of the agencies in which studies were made, and others with special knowledge of the development of the information programs of the national government.

The investigation upon which the summary report and the case studies are based, the organization of the material, and the formulation of the findings have been the responsibility of the author, O.B. Conaway, Jr. He has been guided by the panel at all stages, and they have reviewed his findings and recommendations, discussing them with him and with each other at length. The report as it stands reflects their judgment as well as the author's on all points (except as other views of individual panelists are made clear in the text) although Dr. Conaway is the sole author. The individual case studies have also been cleared with the agencies concerned for accuracy of the material presented.

The National Academy of Public Administration selected the author-investigator, constituted the panel, and provided the organization and supporting assistance for the project. It has attempted to provide a dispassionate analysis and expert panel judgment on the questions put to it. The report has not been presented to the full membership of the Academy, however, nor has it been considered by Academy members beyond those who are on the panel.

George A. Graham
Executive Director
National Academy of
Public Administration

CONTENTS

	Summary	iii
	Extra-Library Information Programs in Selected Federal Agencies by O.B. Conaway, Jr.	1
	Case Studies	
I.	Scientific and Technical Information Program, NASA	21
	Table I-1. National Aeronautics and Space Administration (NASA)	35
	Table I-2. NASA, Office of Technology Utilization	37
	Table I-3. NASA, Division of Scientific and Technical Information, Staff Positions and Professional Staff, Training	39
II.	National Standard Reference Data System, National Bureau of Standards (NBS)	45
	Table II-1. Organization Chart, Office of Standard Reference Data	54
	Table II-2. Office of Associate Director of Information Programs	59
	Table II-3. U.S. Dept. Commerce, NBS	60
III.	National Clearinghouse for Mental Health Information, Office of Communications, NIMH	65
	Table III-1. National Institute of Mental Health (NIMH)	66
	Table III-2. Office of Communications	68
	Table III-3. Positions in National Clearinghouse for Mental Health Information	72
IV.	Pesticides Information Center, National Agricultural Library (NAL), U.S.D.A.	75
	Table IV-1. U.S.Dept. Agriculture (U.S.D.A.)	77
	Table IV-2. Functional Organization, NAL	78
V.	Redstone Scientific Information Center, U.S. Army Missile Command, Redstone Arsenal	83
	Table V-1. Research and Engineering Directorate Directory Chart	84
	Table V-2. Redstone Scientific Information Center	87
VI.	Plastics Technical Evaluation Center, Picatinny Arsenal, U.S. Dept. of Army	89
	Table VI-1. Dept. of Defense, Plastics Technical Evaluation Center, "PLASTEC"	92
	Table VI-2. Feltman Research Laboratories	96
	Table VI-3. Scientific and Technical Information Branch	98
VII.	Medical Literature Analysis and Retrieval System (MEDLARS), National Library of Medicine (NLM)	101
	Table VII-1. Organization Chart, NLM	104

EXTRA-LIBRARY INFORMATION PROGRAMS IN SELECTED FEDERAL AGENCIES

Objectives and Organization of the Study

In 1967 the Federal Library Committee began an investigation of the relationships of Federal libraries to other information activities in the government. The Committee's primary objectives were to evaluate the adequacy of these relationships and to determine the role of the library in a total, integrated information system. Responsibility for this project was assigned to a Committee Task Force on the Role of Libraries and Information Systems established in 1967. The Task Force included representatives from Federal agencies and a school of library science.

The Task Force decided to make two studies to acquire additional information for its analysis and recommendations. The first study commissioned was a state-of-the-art review, *The Role of the Library in Relation to Other Information Activities*, by Ann F. Painter of the Graduate Library School, Indiana University. This report was published in August 1968.[1]

The second study desired by the Task Force was an analysis of the administrative problems created by the development of extra-library information programs in selected Federal agencies. Financial support for the project was obtained from the Council of Library Resources and the Corps of Engineers, with the Corps administering the contract. This study was undertaken by the National Academy of Public Administration in December 1968.

The contract between the Academy and the U.S. Army provided that the Academy would:

> Investigate the present characteristics of, and relationships between, technical libraries and other (extra-library) information storage, analysis, and retrieval systems, and libraries. The study will be a basis for understanding the origins and rationale of the present arrangements. It will identify those significant characteristics which differentiate libraries and extra-library information systems. It will provide essential information to guide actions which may be taken by the Department of the Army or other departments and agencies to improve the effectiveness, and allocation, of resources to information services.
>
> Specifically the study is designed to:
>
> 1. Determine how and why extra-library information storage, analysis, and retrieval systems have been established.

2. Determine the place of information systems (both library and extra-library) within the total structure of each of the agencies selected for further study. Particular attention shall be paid to the significant administrative, and budgetary relationships involved in the management of such systems.

3. Determine functional, organizational, and operational relationships of these systems to technical libraries in the same agencies or in the same geographic locale.

4. Identify the common and unique functions of libraries and extra-library systems. These functions will include processing (e.g., acquisitions, cataloging, etc.) and user services (e.g., reference, analysis, etc.).

5. Provide recommendations, guidance, and conclusions to assist in contemplating policy determinations for the Department of the Army and the Federal Library Committee.[2]

During 1969 the Academy made studies of the information programs of seven Federal agencies selected by the Task Force on the Role of Libraries and Information Systems of the Federal Library Committee:

The Division of Scientific and Technical Information of the National Aeronautics and Space Administration was studied because the Division has influenced the organization and direction of other extra-library information organizations created in the last seven years. In this study the Academy reviewed generally the origins, history, and nature of extra-library information programs in the national government.

The National Standard Reference Data System was studied for two major reasons. First, the System is one of the principal information analysis organizations of the government. Second, the incorporation of the National Standard Reference Data System and the Library of the National Bureau of Standards in an Office for Information Programs seemed to be a significant organizational pattern.

The National Clearinghouse for Mental Health Information is a major organization of its kind and is incorporated in the Office of Communications of the National Institute of Mental Health, which has total responsibility for the agency's information programs. The Office incorporates the Library of the National Institute of Mental Health and the study was expected to yield some insight into the effects on a small library of the independent development of a large special purpose information activity.

The Pesticides Information Center of the National Agricultural Library was studied for two principal reasons. First, to ascertain why

the National Agricultural Library was able to establish the kind of information center created independently of the library in most Federal agencies. Second, the study was expected to provide information on the effects on a library of the establishment of a special information center and, conversely, the effects on an information center of being established in a library.

The Plastics Technical Evaluation Center of the Picatinny Arsenal was studied both to gain further information on the nature and operations of an information analysis center and to explore its relations with and effect on a library with which it has no formal relationship.

The Redstone Scientific Information Center was studied because the unusual organization of the unit seemed to have significance in that while it does not have a computer-based storage and retrieval system its research branch gives it the capacity to organize and manage state-of-the-art surveys and special searches which are conducted by contract. It seemed particularly significant that with the Scientific Information Center having this capacity, neither the Army Missile Command nor the Space Center at Redstone Arsenal had established a separate information evaluation center with a consequent division of information responsibilities.

The origin and development of MEDLARS in the National Library of Medicine was studied to determine whether there were advantages in establishing such an information storage, retrieval, and publication system in a library.

The case studies drew heavily upon interviews with staff members of the information programs studied and with agency officials who had particular knowledge of their origin and development. The interviews were planned and conducted after a review of the major documents of each program studied. Each case study was subsequently reviewed and cleared by the appropriate agency officials. While the number of case studies was necessarily limited, they yielded a very substantial amount of data bearing on the questions with which the Federal Library Committee is concerned. However, seven case studies are not an adequate basis for unqualified generalizations about Federal libraries and extra-library information systems. At present there are approximately 150 extra-library information organizations in the Federal government. The *Directory of Federally Supported Information Analysis Centers*, published by the Federal Council for Science and Technology in January 1970 alone lists 119 such organizations. For comparison there are some 600 libraries in the Federal government.

This study was made with the assistance of a Review Panel, appointed by the Chairman of the National Academy of Public Administration, which included:

Dr. Allen V. Astin
Former Director
National Bureau of Standards

Dr. Lee G. Burchinal
Director, Division of Information
Technology and Dissemination
Bureau of Research
Department of Health, Education,
and Welfare

Mr. Verner W. Clapp
Consultant
Council on Library Resources, Inc.

Mr. Henry J. Dubester
Department Head
Office of Science Information Services
National Science Foundation

Mr. Paul Howard (ex officio)
Executive Secretary
Federal Library Committee

The Honorable Charles A. Mosher
House of Representatives

The Honorable Elmer B. Staats
Comptroller General of the
United States

Dr. Henry Voos
Rutgers University Library School
New Brunswick, New Jersey

In the following pages the Academy has defined certain administrative problems of particular significance for librarians, as well as agency officials, caused by the development of the extra-library information programs it has studied and has proposed solutions to them.

The Nature and Establishment of Extra-Library Information Programs

A statement in considerable detail of the origin and development of extra-library information programs was presented in the first study of this subject made for the Federal Library Committee: *The Role of the Library in Relation to Other Information Activities*, a state-of-the-art review by Ann F. Painter, noted previously.

While there has been and is considerable controversy about the nature of extra-library information programs, there is agreement on certain points. The great majority of these organizations are in the agencies with missions in the biological and physical sciences. The impetus for their establishment came from the scientific community which needed help in coping with the increasing amounts of literature--and had the funds to pay for such services. The information programs typically in-

clude the acquisition, processing, storing, retrieval, evaluation, and dissemination of technical information.

While a useable general definition may be made of extra-library information programs or activities, there is sufficient difference in the organizations that perform them that they may be classified roughly as:

- Information analysis centers engaged primarily in evaluating information and preparing specialized reports. A widely accepted definition of an information analysis center was written by Dr. Edward Brady of the National Bureau of Standards:

  > An information analysis center is a formally structured organizational unit specifically (but not necessarily exclusively) established for the purpose of acquiring, selecting, storing, retrieving, evaluating, analyzing and synthesizing a body of information in a clearly defined specialized field or pertaining to a specified mission with the intent of compiling, digesting, repackaging or otherwise organizing and presenting pertinent information in a form most authoritative, timely, and useful for a society of peers and management.[3]

- Technical information centers that collect information, particularly in document form, abstract and index it and make it readily available to their users through announcement journals and special publications.

- Clearinghouses which collect and maintain records of research and development but refer only to sources and do not supply either data or documents.

- Data Centers that collect and organize quantitative data.

- Data Analysis Centers that analyze quantitative data.

- Organizations engaged primarily in providing indexing and abstracting services.

- Organizations engaged chiefly in publishing announcements, bibliographies, and special reports.

Although these general distinctions may be made, some of the government's extra-library information programs include all of these activities.

The origins of the extra-library information programs studied are in the missions of their respective agencies. The Division of Scientific and Technical Information of the National Aeronautics and Space Administration was created to acquire and facilitate utilization of a great body of new literature considered essential to success in the agency's missions. The National Standard Reference Data System was established, in

the terms of Director of the National Bureau of Standards, "to give to the technical community of the United States optimum access to the quantitative data of physical science, critically evaluated and compiled for convenience." The Plastics Technical Evaluation Center was established to give the Department of Defense a central source of essential information on properties and applications of plastics in defense programs. The National Clearinghouse for Mental Health was created to enable the National Institute of Mental Health to utilize the vast literature produced in the field each year.

Whatever the specific nature of the extra-library information programs studied in this project, they were established, first, because of the inability of management and professional staffs to continue to do primary research and, in some cases, to provide basic evaluation with sufficient speed. They are in fact means of coping with the "knowledge explosion" and the increasingly interdisciplinary nature of research and program activities. Second, they were created to assist their agencies in carrying out their missions by supplying needed services that existing libraries either did not supply, could not supply, or which agency administrators considered them incapable of supplying. All of these information programs are characterized by active use of information for agency purposes--by efforts to assist management in the swift and accurate utilization of great and increasing volumes of information. The degree of service varies greatly from simply organizing information for general use to providing answers to specific questions.

While these general statements about the founding of the extra-library information programs studied are warranted by the case studies, they did not indicate that these new programs were created by single linear decision processes. Rather, the decisions were influenced by many factors including changes or expansions of agency functions. The necessity to create or acquire information quickly was a factor in the establishment of each of the extra-library programs. The concepts of the library function and of library personnel held by the respective administrators were significant as were their ideas of the possibilities of collecting, analyzing, and using information by means other than those presently employed by the agency library. Another factor was the possibility of obtaining funds more easily for a new, extra-library program. Further, in some cases the personalities of library staff were significant, as were their concepts of their function. In summary, the case studies indicated that the extra-library information programs studied were established by complex and sometimes conflicting concepts, personalities, and forces.

While the agencies discussed above established new independent organizations to supply their information needs, the other agencies studied developed new information services within their libraries. The Pesticides Information Center, created to assist the Department of Agriculture in fulfilling its responsibility for the control of pesticides, was established in the National Agricultural Library. The Redstone Scientific Information Center created an Information Research Branch to plan and direct literature research projects. MEDLARS was created by the National Library of Medicine primarily to facilitate production of its

basic publication, *Index Medicus*. These programs, too, are characterized by active use of information to assist in the achievement of agency objectives.

Administrative Problems Caused by the Establishment of Extra-Library Information Programs

There did not seem to be any question of the need for new and expanded information services in the agencies studied or doubt of their continued existence and probable further expansion. Their establishment, however, has created at least four substantial administrative problems for librarians, as well as for agency leaders: (1) the question of whether extra-library information programs duplicate the functions of the libraries in their agencies; (2) the administrative positions of libraries and extra-library information programs; (3) the clash of newcomers to the field of information collection, analysis, and dissemination with the librarians who formerly dominated the field; and (4) disparities in the salaries of librarians and staff of extra-library information programs. The problems are considered in the following pages.

Duplication of Functions

The first and most general administrative problem created by the establishment of extra-library information programs in the agencies studied is that of whether they duplicate the functions of the libraries in their agencies. The establishment of an extra-library information program sometimes has had adverse effects on the agency's library in that the new organization has received greater budgetary support and higher grade levels. In considering this question it is useful to note first the Federal Library Mission which is presented on following pages.

Miss Painter, in her study quoted above, *The Role of the Library in Relation to Other Information Activities*, made this statement on the question:

> The Federal Library has a tradition of dealing primarily with books, or book-type materials. Its functions related to these materials involve the acquisition, collection, recording, organization, storage, retrieval and to a certain extent dissemination of materials. The Library is for the most part discipline oriented but in inclined to be staffed by the professional, funded as an overhead item of the budget, and placed in a relatively low subordinate position in the organizational structure of the agency.
>
> The Federal Information Center has been characterized as dealing with information, data, or the contents of books. Its functions seem almost identical with

> those of the Library: acquisition, collection, recording, organization, storage, retrieval and dissemination of this data or information. They are, however, usually extended to include some others oriented toward services particularly: compilation, creation and publication of information itself. The Information Center is apt to be mission oriented and hence supports the activities of a narrow and limited clientele. It is staffed by subject specialists with research background, funded as a special item in support of a particular program, and maintains relatively the same organizational position as the Library.[4]

While findings of this study do not challenge Miss Painter's general statement, they do indicate that greater emphasis probably should be placed on certain distinguishing factors.

The Federal Library Mission[5]

Definition and Scope. Federal libraries support the missions and programs of their agencies principally by providing bibliographically related information services. To achieve this objective they have at least four basic responsibilities:

a. To collect and organize pertinent recorded information, in whatever form required, to meet managerial, research, educational, informational, and other program responsibilities;

b. To provide ready access to their materials and to assist users in locating required information;

c. To disseminate pertinent information from their collections on a selective basis;

d. To make their collections and services known to present and potential users.

Library Functions. To discharge these basic responsibilities, Federal libraries perform a range of tasks including assistance to users through literature searching, reference service, bibliographic work, professional guidance to readers, lending and borrowing materials, and by supporting these services through selecting, acquiring, cataloging, indexing, and abstracting pertinent materials. The effective performance of these functions requires continuing appraisal of the information needs of the agency.

Relation to Federal Community. The collections of Federal libraries constitute an important resource for providing information needed in daily operation of the Government, and in the conduct of agency research programs. Inter-library lending, inter-agency reference assistance, cooperative cataloging, literature searching, and other forms of cooperation are essential to full and efficient use of this resource.

Relation to Research Community and the General Public. Increasingly, a community of interest has developed among Federal and non-Federal library users. Federal libraries support those missions of their agencies that relate to non-Governmental groups by extending their library services to other libraries, research institutions, and the general public.

To the leaders of the four extra-library information programs studied--The Division of Scientific and Technical Information of NASA, the National Standard Reference Data System, the National Clearinghouse for Mental Health Information, the Plastics Technical Evaluation Center and the Pesticides Information Center of the National Agricultural Library--these activities particularly distinguished their organizations from the libraries of their agencies: the evaluation of data, the creation of new information, the kinds and volume of information handled, the kinds and volume of publications to disseminate information, sophisticated storage and retrieval systems, and the development of special services for a specific clientele.

In addition to these program distinctions, the directors of extra-library information organizations emphasized some intangible ones. They believed their programs are more closely related to agency program planning and administration than are those of most libraries. Most of their staff members, they noted, are trained in fields other than library science and have been aggressive in defining and managing their activities.

While they emphasized the distinguishing factors of their activities, the directors of the information organizations listed above stated that they were engaged, as are libraries, in the acquisition, collection, recording, organization, storage, retrieval, and dissemination of informational materials. In fact, the interviewees in the Division of Scientific and Technical Information of NASA saw no basic difference in the mission of their organization and that of the Federal libraries as expressed in the Federal Library Mission. However, these interviewees did maintain that their activities which can be characterized as traditional library ones were secondary to their primary purposes of evaluation, control of large volumes of information, creation of information, publication, and specific user services.

While the case studies revealed that in four agencies organizations other than libraries were also engaged in part in certain traditional library activities, it does not follow that this activity is unneeded. In the case of the four non-library programs the agency libraries, in the opinion of agency administrators, could not have provided the needed new information services. To provide the required services, it was necessary in each case either to create an additional in-house staff or to rely on services supplied by contractors. But in creating the new facilities it does not seem that the agencies made full use of existing library resources. In fact, the case studies indicated that the libraries of the respective agencies in which studies were made could have contributed much more substantially than they did, or were allowed to, in the development of new extra-library information programs. For example, it seemed that in some cases (especially Plastek and the National

Clearinghouse for Mental Health Information) the acquisitions facilities of agency libraries could have been utilized instead of cre ing new acquisitions units.

In summary, the case studies did not indicate that the four extra-library information programs studied have materially duplicated the programs of the libraries of their agencies. Rather, these organizations are engaged in supplying information services not supplied by the agency library.

Administrative Positions

The second general administrative problem created by the establishment of extra-library information programs results from their administrative positions vis-a-vis libraries. At least three of the extra-library information organizations studied--Division of Scientific and Technical Information of NASA, National Clearinghouse for Mental Health Information, National Standard Reference Data System--have stronger administrative positions than the libraries of their agencies measured by organizational position, financial resources, relative staff size, and salaries. The libraries of NASA are only one component of its Division of Scientific and Technical Information. The National Clearinghouse for Mental Health Information is older and several times larger than the library of the National Institute of Mental Health in terms of funds and personnel, and has a staff that is paid at substantially higher levels. The National Standard Reference Data System is in the Office for Information Programs, but is closer to the research processes of the Bureau of Standards than is the library, and its head and staff have higher grades than the librarian and the library staff. The Plastics Technical Evaluation Center should be considered administratively stronger than the Scientific and Technical Information Branch of Picatinny Arsenal in that is is closer to research policy and processes, has relatively greater resources, and a more highly paid staff.

The difference in administrative status has caused problems of morale, effectiveness, and recruitment for the libraries which have long histories and professional staffs. Still, the effects on libraries have not been unmixed. In the opinion of the headquarters librarian of NASA, his position has been strengthened by the incorporation of the library in the Division of Scientific and Technical Information. The librarian of the Bureau of Standards believes her organization has benefited from being placed in the Office for Information Programs along with the SDRDS and other specialized information programs in terms of status, facilities and opportunities to influence information policy. The library of the National Institute of Mental Health has been similarly strengthened by being made an integral part of the Office of Communications.

Newcomers vs. Librarians

The third general administrative problem caused by the development of extra-library information programs is that they have brought into the field of information collection, analysis, and dissemination many persons trained in disciplines other than library science. The findings

of the case studies indicate that in at least five of the agencies studied--NASA, Bureau of Standards, National Institute of Mental Health, Plastics Technical Evaluation Center, and the Redstone Scientific Information Center--non-librarians now dominate the information activities with correspondingly higher status, larger salaries, and more opportunities for advancement than the librarians in those agencies. MEDLARS probably can be added to this list because the National Library of Medicine is largely directed by nonlibrarians.[6]

The skills of the new information program leaders in six of the seven programs studied include primarily administrative sensitivity, management ability, professional training in the field of the literature, and understanding of the possibilities of electronic data processing. Interviews with the directors and staff of the information programs studied indicated that these men as a group, whatever their training, had seen the need for additional information activities in the government and seized them--both to the benefit of their agencies and the advancement of their careers.

The newcomers to the field include chemists, physicists, statisticians, medical doctors, psychiatrists, specialists in electronic data processing, and many others as indicated by the case studies in this project. Many of them hold positions in the Technical Information Services Series, GS-1412, established in 1966. Others hold positions in subject matters fields such as the Chemistry Series GS-1320. Still others, and ones who have great influence, are those who hold positions as science administrators. Examples of such positions are to be found among the agencies studied especially in the National Library of Medicine. It is to be noted that in some cases librarians have transferred to one of these series in order to gain status and accompanying salary increases.

The need of extra-library information programs for persons trained in a number of professional fields other than library science raised another question: would such personnel work in a library? The directors of the National Standard Reference Data System and National Clearinghouse for Mental Health Information do not believe that men trained in the fields in which they work could be recruited to a library. And neither believe that the professions they serve would accept the work of an organization subordinate to a library. The Director of the National Agricultural Library, which incorporates the Pesticides Information Center, disagreed and stated that with sufficient funds he could hire all the chemists, physicists, et. al., needed for an information analysis program.

Library science is not the first professional field to be invaded by outsiders, and it seems that the government's information activities have been invigorated and refined as well as expanded by the mass infusion of persons trained in other fields than library science. A considerable number of newcomers have demonstrated greater administrative capacity than the librarians in their agencies and, as noted above, of the seven information organizations studied only one, the Pesticides Information Center, is headed by a librarian.

Salary Disparities

The fourth general administrative problem created by the growth of extra-library information programs is one of salary disparities. The directors of the four extra-library information programs studied are more highly paid than the directors of the libraries of their agencies, and professionals in the extra-library information programs are more highly paid than are professional librarians in the same agencies. For example:

- In the Division of Scientific and Technical Information of NASA, the Director had a grade 16 position, Branch Chiefs had a 15 grade, while the headquarters librarian had a grade of 13.

- The Chief of the Plastics Technical Evaluation Center holds a grade 14 position, while the Chief of the Scientific and Technical Information Branch, which incorporates the library of Picatinny Arsenal, has a grade 13 position.

- The position of Director of the National Standard Reference Data System is classified as GS-17, the librarian of the Bureau of Standards holds a grade 14 position.

- The director of the National Clearinghouse for Mental Health Information is a Public Health Service Officer, which makes it difficult to equate the position to a GS grade. However, the Scientific Director of NCMHI is at grade 15, while the head librarian of the National Institute of Mental Health has a GS-11 position.

Further, it was found that the average grade level of professional employees in the extra-library information programs studied is significantly higher than that of the professionals in the agency libraries. The salary problem has affected the morale and performance of librarians and made recruitment more difficult. It is a major factor in all of the controversies over the establishment of extra-library information programs. A more detailed consideration of salary differentials is in the following section of this report.

In summary, the creation and growth of extra-library information programs in the agencies studied has created two primary administrative questions: How can an agency's information activities be organized for maximum effectiveness? How can the agency's library be utilized as fully as possible in the total information system?

Conclusions

The case studies in this project led to three principal conclusions: (1) major federal agencies need comprehensive and integrated information systems, (2) very few Federal libraries have the capacity to administer comprehensive information programs, and (3) most Federal libraries can make a greater contribution to agency information programs than they have in the past and should be given the resources to do so. These conclusions are discussed in the following pages.

Comprehensive and Integrated Information Systems. Case studies in this project indicate that major Federal agencies need comprehensive and integrated information systems. It seems that most information systems probably should include most, if not all, of the extra-library programs discussed previously. The case studies in this project indicated that information activities of these kinds will increase in importance in the execution of most agency missions.

The directors of the extra-library programs studied believe their value has been demonstrated in their respective agencies. To them NASA probably could not have succeeded in its various missions without the vast supply of information gathered and controlled by its Division of Scientific and Technical Information and the special user services it supplies. The National Standard Reference Data System was created to meet a major and pressing national need. The National Clearinghouse for Mental Health Information is essential to the operations of the National Institute of Mental Health. The Plastics Technical Evaluation Center has been very useful to the Department of Defense and to its contractors.

The directors of the new information activities studied in the Department of Agriculture, the National Library of Medicine, and Redstone Arsenal concurred with the directors of the extra-library information programs in evaluating their contributions to their agencies. To them the Department of Agriculture could not have discharged its responsibility for the control of pesticides without the Pesticides Information Center. MEDLARS has been of incalculable value to the nation's effort toward better health. And the Redstone Scientific Information Center has met the essential information needs of the military and space agencies it serves.

The case studies further indicated that the libraries of the agencies in which extra-library information programs were created--NASA, the Bureau of Standards, the National Institute of Mental Health, and Picatinny Arsenal--could not have supplied the required new information services. The essential personnel and other resources simply were not present in these libraries when their agencies required additional information services, and it is doubtful that they could have been reorganized and expanded in time to provide them. Some of the factors that indicated new special-purpose organizations were needed were vested interest in leadership of libraries, grade levels, problems of obtaining funds quickly for library expansion, and the difficulty of recruiting information managers and professional specialists to libraries. Under the circumstances that existed, the management decisions to create new information organizations in these agencies seems justified both by the program needs at the time and by the effectiveness of the extra-library information programs.

In considering the three libraries studied which incorporate information activities organized outside the libraries of the four agencies discussed above, their comparatively large resources should be fully recognized. Both the National Agricultural Library and the National Library of Medicine are large, well-established organizations that had the

resources, including those of leadership and status, to establish large new information programs: respectively, the Pesticides Information Center and MEDLARS. The national libraries are in fact unique among Federal libraries. Their programs and budgets are so much larger than those of most Federal libraries that they differ in kind rather than degree. The library of the Redstone Scientific Information Center, which provided the base for the organization of its Information Research Branch, also is a library of exceptionally large resources. It may be noted further that the first major information center of the Federal government was the Legislative Reference Service established in the Library of Congress.

It may well have been that the librarians of the four agencies studied in which extra-library information programs were created were not sufficiently aggressive, perceptive, capable, or management oriented to seize the opportunities offered by new information needs and technology. However, the principal cause of the weakness of these libraries seems to have been lack of resources. This lack of resources indicates that the libraries studied had not had adequate management attention and support, with a consequent limitation of their potential for further development.

Administrative Capacity. A second conclusion of this study is that very few Federal agencies have libraries with the capacity to administer comprehensive information programs. The great majority of them lack both the experienced leadership and technical resources to assume general responsibility for such programs. Thus it seems that in most agencies the more feasible approach is to consider the library as having a substantial but not exclusive role in an information system. Exceptions to this observation are agencies that include the large libraries studied--the National Library of Medicine, the National Agricultural Library, and the library of the Redstone Scientific Information Center.

This conclusion is in accordance with the conclusion of the state-of-the-art review by Ann F. Painter, *The Role of the Library in Relation to Other Information Activities*:

> analysis and interpretation of the data reveals that the state-of-the-art places the library as a major element within a more comprehensive network or system, that the nature of the information handling problem has become so complex and the demands so varied that no one element can hope to provide total service and control. Thus the responsibilities must be divided among the library, the data center, the clearinghouse, the abstracting service, the distribution center and the referral center, each with fairly defined purposes, functions and services.[7]

The case studies in this project indicate strongly that the organization of an information program must be determined by the mission of the agency. In planning the organization, a system approach is indicated with emphasis on functions, interrelationships, and total services

needed. If all information functions are not placed in the library, then the library and other information units must have a common reporting point to insure coordination.

Two organizations designed to give their agencies comprehensive and integrated information programs were studied in this project--The Office for Information Programs of the National Bureau of Standards, which incorporates the National Standard Reference Data System, and the Office of Communications of the National Institute of Mental Health, which incorporates the National Clearinghouse for Mental Health Information.

The Office for Information Programs of the National Bureau of Standards includes not only the National Standard Reference Data System, but also the Library, the Clearinghouse for Federal Scientific and Technical Information, the Office of Technical Information and Publications, the Office of Public Information, and the Office of International Relations. The Office of Communications of the National Institute of Mental Health includes, in addition to the National Clearinghouse for Mental Health, an Information Service Branch, a Public Information Branch, and the agency Library.

The Bureau of Standards regards the functions in its Office for Information Programs as interrelated and interdependent, and thus ones which should be administered as parts of a whole. The administrators of the National Institute of Mental Health so regard the respective units of its Office of Communications. As noted in the case studies, the libraries of both agencies have benefited from incorporation in a comprehensive information system. They have been given greater administrative status and more direct communication with administrative chiefs, and are receiving greater support. Further, this kind of organization has enhanced their future prospects. On the basis of the case studies in this project, it seems doubtful that agencies maintaining separate library and extra-library information programs are using their resources as effectively as possible.

The success of the organizational schemes for information services adopted by both the Bureau of Standards and the National Institute of Mental Health indicates that they should be considered carefully by other agencies concerned about adequate organizations for information (see entry below).

In order to obtain a general indication of concern in the National Government about reorganization of information services, both library and extra-library, a survey was made in the course of this study of the following departments and agencies:

Atomic Energy Commission
Commerce Department
Department of Health, Education and Welfare
Department of Housing and Urban Development
Department of Interior
Department of Transportation

Environmental Science Services Administration
Justice Department
Labor Department
Office of Economic Opportunity
Office of Education
Post Office Department
Smithsonian Institution
State Department
Treasury Department
Veterans Administration

While the question of creating a comprehensive information system had been considered in all of these departments and agencies, such an information organization had been established only in the Atomic Energy Commission, the Office of Economic Opportunity and the Environmental Science Services Administration. The Department of Housing and Urban Development, the Veterans Administration and the Smithsonian Institution indicated that general reorganization of information services was under active consideration.

Greater Library Contribution. A third conclusion of the project is that Federal libraries probably can make a greater contribution to agency information programs than they have in the past, and should be given the resources to do so.

It would be a great waste of a large investment and of scarce resources if the government's agencies do not utilize their libraries to the fullest extent in the creation of total information programs. The case studies indicated that the Federal library community probably has changed more in the period in which nonlibrary information organizations were proliferating than most administrators realize. The great majority of the librarians interviewed were quite aware of the challenge of new information needs and concerned that they contribute as much as possible to filling them. They understand the reasons for new and expanded information activities and most of them believe in the concept of total information systems. They are familiar with electronic data processing and many of them have made substantial changes in the organization of their libraries to make them more effective.

To say the least, while a total information program can help libraries achieve greater status and support, the libraries can contribute most significantly to the success of the general organization. The primary value of the study of MEDLARS was insight into the contributions a good library can make to the development of and use of a computerized information storage, retrieval, and publications program. The directors of the National Library of Medicine emphasized that MEDLARS was founded on deep understanding of indexing technology derived from long bibliographic experience and developed in a library which could match power of retrieval citations with the power of supplying textual information from the published literature.

It follows, however, that if Federal libraries are to contribute as fully as possible to total information systems, they must have resources they now lack, The present salary grades assigned to the libraries may be the greater barrier to their further development in that

FOOTNOTES

1. Painter, Ann F., *The Role of the Library in Relation to Other Information Activities* (TISA Project Report No. 23, Clearinghouse for Scientific and Technical Information, Springfield, Virginia, 1968).

2. Exhibit "A," Contract between the U.S. Army and the National Academy of Public Administration, November 21, 1968.

3. Federal Council for Science and Technology, Committee on Scientific and Technical Information, *Proceedings of the Forum of Federally Supported Information Analysis Centers*, November 7-8, 1967. Washington, 1968.

4. Painter, *op. cit.*, p. 49.

5. The Federal Library Committee, *The Federal Library Mission: A Statement of Principles and Guidelines* (Library of Congress, Washington, D.C., 1968).

6. The director of the Pesticides Information Center was trained as a librarian.

7. Painter, *op. cit.*, p. 4.

8. SM56-7, October 31, 1967. U.S. Government Printing Office, Washington, D.C., 1968.

9. U.S. Department of Health, Education, and Welfare (U.S. Government Printing Office, Washington, D.C., 1968).

they have made recruitment difficult, created morale problems, and caused some librarians to reject opportunities for further training.

The U.S. Civil Service Commission's publication *Occupations of Federal White-Collar Workers*[8] summarizes the salary position of Federal librarians in 1967. Their median grade at that time was grade 9, as compared to grade 12 for all professional groups. The average salary differential was $2,301. The median grade at that time for persons in the Technical Information Service category was grade 11. This salary situation did not change in 1968, the latest year for which data is available.

The Survey of Special Libraries Serving the Federal Government,[9] published in 1968, revealed a concentration of high-level library positions in the national libraries. In 1965 there were 154 library positions in GS-14 and GS-15, of which 132 were in national libraries. Of 42 positions in GS-16 and above, 41 were in the national libraries. More than half of the heads of libraries at that time were GS-9 to GS-11 and made less than $11,300 annually.

It seems that the present grade level assignments and resulting salaries of all but a very few Federal libraries are unlikely to attract and hold men and women capable of creating and administering the new information services needed by most agencies. The case sudies in this project indicate particularly that the salary assignments in the 1410 series should be reviewed by agency administrators and the Civil Service Commission and compared with those in the 1412 Series. At the least, the reasons for the apparent salary discrepancies would be analyzed in such a process. However, further improvement in library salaries may well depend on the incorporation of libraries in total information systems, with a consequent increase in functions and status.

There are other resources needed by the Federal libraries. They need authority and funds to employ appropriate subject-matter specialists as needed. Training funds should be increased and their needs for additional collection resources met. Funds also should be provided to enable them to utilize recent technological developments, particularly in communication and reproduction. To do otherwise is to allow an important government resource to depreciate further. The value of this resource is great. There are approximately 1,600 Federal libraries holding a total of more than 35,000,000 volumes. At present some 3,500 librarians are employed in these libraries which have annual operating budgets totaling more than $60,000,000. Not only do the Federal libraries represent a large public investment; the success of the agencies they serve depends importantly upon them. Such a resource should be conserved and used fully.

Many agencies of the National Government have created new and effective programs to supply the information needs of their complex and urgent missions in a time of tremendous volumes of new information. The case studies in this project indicate that some of them have not utilized their libraries as fully as possible to the detriment of both the extra-library information programs and the libraries. This study also

indicates that in the past three years there has been a general reconsideration of the proper relationships of libraries and "extra-library information programs." It now seems that there is a definite trend toward their integration in total information systems. This integration, which requires careful analysis of information needs, resources, and programs, is a challenge to management and an opportunity to better use the government's resources.

I. THE SCIENTIFIC AND TECHNICAL INFORMATION PROGRAM OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

The National Aeronautics and Space Administration, established on July 29, 1958, always has had unusual information obligations and requirements. The National Aeronautics and Space Act charged the agency to "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof." The new agency's most urgent information problem, however, was to support the work of its management program offices, functional offices and contractors with all of the world's aerospace literature. These obligations and requirements caused the agency to create a pioneering information program.

The importance and urgency of NASA's information needs were recognized immediately by its administrators and given high priority in the agency's affairs. A comprehensive inflow of technical information was absolutely essential to program success and the leaders of the agency were fully in agreement with the importance of disseminating the information created by its projects. Dr. Keith Glennan, the first NASA Administrator, had been a member of the Atomic Energy Commission which had information needs generally similar to those of NASA and was especially sensitive to information problems. Other NASA administrators, notably Dr. Hugh Dryden, Associate Administrator, were particularly concerned with the information problems as were the agency's scientists and technicians generally.

The information system of the new agency was for the first two years of its existence a continuation and expansion of the information system of the National Advisory Committee on Aeronautics which had been initiated in 1915. In 1958 and 1959 the agency's publication program, administered by its Technical Information Division, included:

- *NASA Technical Memoranda* issued at the rate of approximately 675 annually.
- Papers for scientific journals (about 75 per year).
- Papers delivered by NASA personnel at conferences held by the agency. Each of the two or three conferences held annually yielded about 25 papers.
- *NASA Technical Reports* of projects in process and completed experiments (about 75 a month).
- *NASA Technical Translations* of foreign technical documents (60-75 annually).

NASA also published at intervals of two and four weeks *Publications Announcements* containing abstracts of NASA reports. The circulation list for the document at this time was approximately 4,800 addresses

Preceding page blank

in industry, universities, the military, other government agencies and 28 foreign libraries.

While these programs were being carried forward NASA's information need and responsibilities were being reassessed and in 1959 some changes were made in the program. The publication of *Technical Notes* was begun to present completed phases of projects or investigations. The holdings of the headquarters library were increased and the library opened to the public. NASA supplied financial support for the Monthly Index of Russian Accessions prepared by the Library of Congress, for Abstracts of Aerospace Medicine prepared under the direction of the Aero-Space Medical Association and other bibliographies with aerospace implications. The agency also completed arrangements to provide its contractors with the same type of technical information services that were being furnished to Department of Defense contractors by the Armed Services Technical Information Agency.

The information programs of 1958 and 1959, while greater in size and coverage than those inherited from NACA, were not considered adequate to the agency's needs by its administrators and scientists and efforts were started toward a basic reorganization and expansion.

In 1959 an Office of Technical Information and Education Programs was established under the direction of Shelby Thompson who had transferred from the Atomic Energy Commission. Thompson, an information specialist of long experience in AEC and the U.S. Department of Agriculture led the further definition of NASA's information needs and responsibilities. In June, 1960, Thompson appointed Melvin S. Day of AEC as Assistant Director of the Office of Technical Information and Education Programs with responsibility for further developing the technical information programs. Trained as a chemist, Day long had been engaged in planning and administering scientific information networks in AEC. In less than three months Day designed a new and expanded information program and proposed its adoption.

The objectives of the information system proposed by Day were not small. He believed that the system had, first, to provide NASA and its contractors with all of the world's significant information on aeronautics and space--that knowledge was the common requirement and principal product of all NASA programs. By "information" he meant not only literature but raw and processed data, project information, coverage of ongoing research and such items as specifications and engineering drawings. Such information had to be drawn from government agencies, industrial firms, research institutions and scientific laboratories. Further, the information had to be acquired with such speed that it was current and packaged and disseminated to scientists and engineers in the national aerospace programs in such a manner that it was of greatest use. Second, Day believed that the information system had to be capable of organizing, processing, and disseminating the results of NASA's research, development and application fully and in the forms of greatest utility.

The information program proposed by Day to achieve these objectives was extra-library in nature. He had specific reasons for believing

that the NASA libraries at that time could not organize and conduct the information programs required by the agency:

- The existing libraries did not have the capacity for worldwide acquisition of information on aeronautics and space.
- The information needed by NASA was principally in the form of unpublished material, chiefly highly technical research and development reports which the libraries did not have the expertise to adequately abstract and index.
- The libraries did not have means of discharging NASA's responsibility for the packaging and dissemination of information which required a substantial publication capacity.
- The libraries did not have the capacity to fully process the anticipated volume of raw material.
- The library procedures were not adequate for the acquisition and dissemination of essential information with the speed required in support of a dynamic technological program.
- The staffs of the libraries did not have adequate understanding of the agency's information needs and the technical ability to design and operate the necessary information system.

For these reasons Day believed that an information organization was required that would incorporate the existing libraries and also new programs for packaging and processing information based on the use of computers and such technical innovations as microfiche. The organization he visualized would require a staff, in addition to trained librarians, of persons capable of designing and managing large information systems and with special competence in electronic data processing.

To create quickly the information program he envisaged, Day further proposed the use of a contractor to:

> . . . Acquire and select, in accordance with detailed NASA guides, documentary material for NASA library collections; abstract and index the items of value; compile indexed abstract journals to announce the newly acquired materials, and prepare the journals for printing and distribution by NASA.
>
> . . . Process selected acquisitions into microform for economical duplication and full-size reproduction; place copies of processed documents in the NASA library system; maintain comprehensive bibliographic records of the acquired material and provide responsive answers to reference questions from NASA, its contractors and other participants in the national space program;

> prepare for distribution of up-to-date bibliographies in several pre-selected specialized subject areas.
>
> . . . Install and operate automated and mechanized equipment to provide management and bibliographic control of scientific and technical documents.[1]

The proposal made by Day was supported by Thompson and approved by the Space Administrator, Dr. Glennan, in August, 1960. In the following two years, as discussed below, the new NASA Scientific and Technical Information Program was developed in accordance with Day's proposal and under his direction.

It is to be emphasized at this point that the decisions as to the basic information needs of NASA and the appropriate organization to supply them were made by the agency's administrators, scientists and information specialists. NASA's professional librarians at that time did not contribute significantly to these decisions or to those on major developments of the information program. Dr. Glennan stated in an interview in this project that NASA's librarians did not play a significant role in his administration in the design and direction of the information system. His successor, Mr. James Webb, stated that he did not consult the agency's librarians about its information system during his administration.

Beginning in 1959 the technical information program was the responsibility of the Office of Technical Information and Education. In 1962 an Office of Scientific and Technical Information was established, directed by Melvin Day. The Office was placed at a high level in NASA, its position reflecting the importance given its functions. The Director reported to the Assistant Administrator for Public Affairs who was directly responsible to the Administrator of NASA.

The functions and organization of the Office of Scientific and Technical Information were essentially those of the present Division of Scientific and Technical Information in the Office of Technology Utilization. As a contract had been signed on December 1, 1961, with Documentation, Inc., of Washington, D.C. for the operation of a Scientific and Technical Information Facility, the staff of the new office could concentrate on program planning and management.

The three divisions of the Office of Scientific and Technical Information were:

1. Technical Services Division
   a. Library Programs Branch
   b. Acquisitions and Dissemination Branch
   c. Translation Branch

2. Technical Publications Division
   a. Publications Standards Branch

b. Book and Monograph Branch
c. Special Publications Branch

3. Documentation Division
   a. Project Information Branch
   b. Information Systems Branch
   c. Operations Branch
      (This Branch was responsible for relations with the Scientific and Technical Information Facility)

The programs of the Office of Scientific and Technical Information were developed on two general assumptions:

> Information requirements internal to the NASA community can only be satisfied through an integrated, comprehensive system that provides ready acess to any recorded knowledge that will assist or improve its technical program. In the same way, the external information requirements which NASA must satisfy can only be met by a system that ensures ready access--for science, for industry, for the educational world and for the general public--to NASA-sponsored scientific knowledge appropriate to a given need.[2]

The projected information program was based on five operating principles (still utilized) which provide essential background for understanding the NASA information system:

1. Service Designed for the Ultimate Consumer. All products, tools, and services provided by the NASA program have as a primary consideration their usefulness to the ultimate corsumer of scientific information: the scientist, the technician, the laboratory worker. They can also, of course, be utilized by intermediate services--by technical libraries or by information centers--wherever this is desirable. But the intent is to give the scientist and technician a free choice: to maintain his own current literature awareness, make his own literature searches, and obtain his own information, or to refer his requirements to information specialists or librarians whenever circumstances so dictate.

2. Timeliness. With the current pace of technological progress, in which today's critical breakthrough is frequently tomorrow's commonly accèpted fact, such a general principle probably needs no emphasis. It should be emphasized, however, that the NASA program is designed to ensure maximum timeliness in all aspects of scientific information service: in the preparation and publication of reports on NASA undertakings;

in the acquisition and processing of non-NASA information bearing on aeronautical and space programs; in the announcement of all materials produced by or flowing into the NASA scientific information system; and in response to specific document requests or bibliographic inquiries. It is in support of this principle that the NASA program is designed as an active rather than a passive function: that is, available materials will in all possible cases be provided to NASA installations, major contractors, and other participating organizations concurrently with their announcement. This will permit a scientist or technician, noting an entry in a NASA announcement journal, to consult the document or documents concerned in his local reference facility without having to request the material from a central Government agency service point.

3. Reliance on Existing Systems. The NASA program must profit from, not compete with or displace, other existing information systems and services. In the field of report literature, upon which NASA's internal bibliographic efforts must concentrate, this requires coordination, collaboration, and wherever possiblesystem compatibility with all other major systems sharing this report-literature orientation. These are primarily Government or Government-sponsored activities such as the Armed Services Technical Information Agency of the Department of Defense; the Technical Information Division of the Atomic Energy Commission; the Office of Technical Services in the Department of Commerce; other agency information systems such as those in the Federal Aviation Agency and the National Institutes of Health; and major Government libraries, including the Library of the Department of Agriculture, the Library of Congress, and the National Library of Medicine. Through general collaboration under the aegis of the National Science Foundation, and through specific collaboration with agencies whose information systems are directly related to NASA's, the policies and procedures of the NASA program are being keyed as directly as possible to those of all complementary systems. In most cases, this direct tie-line, and the resulting operational compatibility, will even permit direct interchange of machine-processed information between the NASA and the related information systems.

Similar collaboration has already been established in many cases with abstracting, indexing, and related services that concentrate on the vast bulk of formally published journal literature. Through contracts with professional societies, such as the Institute of Aerospace Sciences, and with other members of the National

Federation of Science Abstracting and Indexing Services, arrangements are being made to promote and where possible improve existing coverage of journal literature through abstracting and indexing services in fields of concern to NASA.

4. Centralization Only When Necessary. In any large-scale information system, the concept of centralized processing and control is at least superficially attractive. More economical production-line operations, more effective control over the myriad details of a documentation service--these and other factors can be cited in support of a strongly centralized system. To do so, however, runs the hazard of rating the needs of the system, per se, above those of its customers, since no completely centralized system can ever be as rapidly and as flexibly responsive to local needs as those of a decentralized operation. The NASA program, in keeping with its first principle of customer orientation, is designed to restrict centralization to those areas where it is advantageous on economic or functional grounds--examples are in the preparation of indexes, the maintenance of distribution authority records and operation of the agency translation clearing house. In other respects, decentralization is the guiding premise of the NASA program. Even in the area of machine-search capability, it is intended to make machine records available to cooperative activities, such as NASA field centers, so that machine searches can be carried out on-site at the point of actual need. As previously emphasized, all document materials in the NASA system will be made similarly available within the NASA community. Through arrangements with other information systems and by a major depository library program, the same principle will be applied to information requirements external to the NASA community.

5. A Variety of Products and Tools for a Variety of "Publics." As a principle unto itself, and in support of those outlined in the preceding paragraphs, the NASA program recognizes that no one type of service, no one reference tool, and no one bibliographic pattern can ever satisfy the multiple "publics"--the multiple needs of thousands of organizations and hundreds of thousands of individual scientists and technicians--which the NASA scientific and technical information program must serve. The NASA publication program must obviously produce technical reports as primary records of NASA undertakings, but it must also produce many secondary publications which collate, resynthesize, integrate, or "repackage" the mass of material contained in such basic records. Its bibliographic services must provide announcement journals

> and indexes to serve the widest possible need; but there must also be provided a wide range of continuing and demand bibliographies, an extensive and flexible reference service, and a machine-search capability to satisfy specific requirements in the greatest depth possible. The NASA dissemination program must satisfy in advance, wherever possible, known requirements of participants in the NASA aeronautics and space programs; but provision must also be made for rapid satisfaction of additional or new requirements as they may be requested by the same audience or by other audiences. In all these ways, and others, the NASA program must continually strive to satisfy efficiently and economically the widest variety of needs with the widest practicable variety of products, tools, and services.[3]

The responsibilities of the divisions and branches of the Office of Scientific and Technical Information in 1962 are noted as a basis for understanding the nature and evolution of the NASA information system.

Technical Services Division

In general, this Division had the responsibility for planning, managing, and monitoring the input and output aspects of the NASA scientific and technical information program.

Library Programs Branch. This Branch was responsible for operating the NASA Headquarters Library--a specialized technical reference facility responsive to both the scientific and the managerial information requirements of the Headquarters staff. In extension of this facility, the Branch also was responsible for providing actual literature research assistance to Headquarters elements in three broad areas--life sciences, physical sciences, and applied sciences or engineering. Finally, the technical personnel who provided this research assistance were also responsible for evaluating the bibliographic products, tools, and services of the NASA scientific and technical information program. Through their own technical capabilities, and through direct and continuing liaison with the user areas which they represent, they provided a "feedback" mechanism to ensure that the program's efforts are consumer oriented in practice as well as in principle.

Acquisitions and Dissemination Branch. Responsibilities assigned to this branch included the establishment and maintenance of acquisition criteria which governed the selection of material to be included in the program, and the establishment and maintenance of the standards and procedures under which materials in the system were distributed within the NASA community as well as to activities and interests external to NASA. In specific support of these responsibilities, the Branch directed NASA's comprehensive exchange program--through which NASA information materials were traded on a world-wide basis for materials produced by other aeronautical and space activities--and the NASA depository library program, which insured the availability of reference collections of NASA publications wherever necessary to satisfy recognized needs.

Translations Branch. This Branch maintained a clearing house for NASA translation requirements, providing close liaison with other government and non-government translation activities to guard against any unnecessary duplication in NASA's efforts, and provided translation capability to meet NASA requirements not satisfied elsewhere. The in-house capability was small, concentrating on correspondence and other matters of immediate concern, but was supplemented through contracts with translating activities known to have special competence in the scientific and technical areas of primary concern to NASA.

Documentation Division

This Division, generally, was responsible for information-processing and related capabilities within the NASA program.

Project Information Branch. This Branch was responsible for establishing and maintaining a system whereby information regarding current NASA research and development activities was identified and recorded before the activities reached the stage of documentary reports. Information on "who is doing what work where" had to be obtained from management and administrative reporting systems, and then organized, stored, and retrieved at need. This storage and retrieval process had to be integrally related to the documentary retrieval system, to the end that the total response to any information inquiry would include both citations of all known documents that may be pertinent as well as all citations of current or projected research and development activities. A further function of the Project Information system was to provide an acquisition control mechanism to ensure receipt of all NASA scientific and technical reports on current research activities as soon as they are available.

While books and journals were acquired for reference use the processing emphasis at that time was on reports. It was estimated that in the first year of operation some 25,000 to 30,000 reports would flow into the system. *All phases of the program were performed by the Scientific and Technical Information Facility.* The collection and Bibliographic Control program also included reference and retrieval services, the publication of abstract journals and indexes, and the preparation of continuing and demand bibliographies. The identification and literature functions were performed by machine in most cases.

Information Systems Branch. Responsibility was assigned to this branch for identifying, analyzing, and evaluating all new methods, systems, techniques, and equipment in the field of scientific communication. Based upon such investigation and evaluation, the Branch was responsible for recommending the adoption or adaptation, wherever appropriate, of new equipment or techniques that would in any way aid any aspect of the overall NASA scientific and technical information program, in terms of efficiency, economy, and effectiveness.

Operation Branch. The central responsibility of this branch was the administration and management of NASA's contract-operated Scientific

and Technical Information Facility. Branch personnel provided or monitored all administrative and functional liaison between NASA and the contractor to ensure effective satisfaction of all recognized requirements in terms of the criteria, standards, and procedures determined by NASA.

Technical Publications Division

The responsibilities of this Division fell into two quite distinct categories: the processing for publication of the technical report literature which comprised NASA's primary information material, and the preparation and publication of a wide variety of so-called "secondary" publications designed to integrate, or resynthesize, the information contained in basic NASA publications.

Publications Standards Branch. One of the major functions of this Branch was the establishment and maintenance of the editorial and related standards under which all NASA technical publications are prepared. The second function involved the control--from administrative and logistic standpoints--of NASA's basic technical report output. This function included responsibility for assuring proper technical approval of all such NASA products, but specifically excluded approval authority as such, since this resided with the NASA technical program offices or, in the case of contract reports, the technical project offices.

Special Publications Branch. This Branch was responsible for the preparation of all secondary publications which are of a continuing or serial nature, as well as such one-time publishing products as symposium proceedings and the like.

The Publication program included, first, basic reporting of work performed under NASA's technical programs in:

NASA Technical Reports
NASA Technical Notes
NASA Technical Reprints
NASA Technical Memorandums
Contractor Reports

Other examples of the Branch's responsibilities included occasional technical reviews, and continuing state-of-the-art summaries. Both this Branch and the Book and Monograph Branch had limited in-house capability for the preparation of appropriate publications and depended largely upon contract efforts through the professional societies, universities and research groups, and commercial activities.

Book and Monograph Branch. Basically, the functions performed by this group were similar to those in the Special Publications Branch, except that they covered periodic publications, such as handbooks and data compilations and state-of-knowledge compendiums.

The objectives and framework of the Division of Scientific and Technical Information were established in 1962 but the expansion and refinement of the information system has continued to be present. In the

following pages the principal developments in the system since 1962 are summarized.

The organizational position of the Office of Scientific and Technical Information was changed in 1963. The Director reported henceforth to the Assistant Administrator for Technology Utilization and Policy Planning rather than the Assistant Administrator for Public Affairs. This organization is the present one although the Office of Scientific and Technical Information became the Division of STI in the Office of Technology Utilization.

The usual staff relationships between the Division of Scientific and Technical Information and the technical, managerial and administrative elements of NASA Headquarters were supplemented by a system of technical information coordinators--individuals designated by the other Headquarters elements to act as focal points for the effective handling of all technical information considerations that were of direct concern to the office represented. Relationships with NASA field elements were handled either through usual command channels or, on operating and procedural questions, directly with personnel in the scientific and technical information function maintained at each of the major field installations.

In this year *Technical Publications Announcements*, the publication used to announce new NASA publications and a few other selected report categories, was expanded and renamed *Scientific and Technical Aerospace Reports (STAR)*. Issued on the 8th and 23rd of each month, the new journal was designed to provide adequate coverage for the thousands of NASA and non-NASA technical reports being issued in the aerospace areas. The Facility began preparing four indexes for each issue of *STAR*: subject, corporate source, personal author and report number. In 1963 *STAR* announced 13,500 items compared to 7,500 items announced in 1962.

In 1963, too, NASA began to develop direct and indirect working arrangements with a number of other information services, domestic and inter-national. The relationships included ones of coordination (mutual information), collaboration, exchange of informational materials, dissemination and NASA financial support to another activity to develop or assist in information programs directly related to its interests. Particular attention was given to the development of relations with the National Science Foundation, the Armed Services Technical Information Agency (Now Defense Documentation Center), Atomic Energy Commission, Library of Congress, National Library of Medicine, Federal Aviation Agency. Internationally, exchange agreements were negotiated with any scientific or technical agency which could properly utilize NASA publications and in turn contribute materials of value to NASA's technical programs.

A fourth major development in the year was an arrangement between NASA and the Institute of Aerospace Sciences to cover world-wide formally published scientific information in the aerospace sciences in their abstract journal. To avoid duplication, IAA concentrated on the journals

of the learned and professional societies and on book literature while *STAR* covered the world output of technical report literature. The two journals complemented each other.

Fifth, the Facility began to supply the NASA research centers with duplicate magnetic tapes on an automatic distribution basis for computer searching locally at the laboratories. Sixth, NASA and the AEC announced that the latter agency had agreed to use NASA's microform method of reproducing scientific and technical publications. This agreement was a long step toward a planned standardization of government-wide microcopying. Seventh, a pilot program was initiated to match subject content profiles of NASA and other scientific and technical reports to the needs and interests of NASA scientists and engineers.

The development of NASA's information system continued vigorously in 1964 to match a rising flow of research results and to meet immediate program needs. The efforts to integrate the system with all others in the field were expanded to include system compatibility where possible. NASA became an enthusiastic participant in the Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology whose objective was the development of an articulated but decentralized Federal information system with government-wide standards and compatible systems. At this time NASA participated particularly in COSATI's projects for microfiche standardization, technical vocabulary compatibility, full utilization of government-wide translation resources and automatic initial distribution of government R & D reports among Federal agencies.

Special attention also was given to further decentralization of the information system with expanded use of duplicate computer tapes and copies of all documents at the individual laboratories.

The newest element to be introduced into the information system was Selective Dissemination of Information (SDI) which was made possible by having all indexes on computer tapes. SDI describes the interests of the individual in matching index language and creates an "interest profile" of the participating scientist or engineer. When the profile is fed into the computer along with the tapes on which index information is stored, the machine selects the reports of interest to the individual and announces them to him automatically. Use of a response card brings the text of the report to the desk of the individual. The developmental operation was sufficiently successful that the agency made the SDI system operational late in 1964.

During the year the publication of *STAR* was further coordinated with that of *International Aerospace Abstracts* with the journals appearing on alternate weeks. In 1964 approximately 50,00 reports and technical articles were covered by the two journals.

In 1964 the NASA microfiche concept, introduced in 1962, was put fully into effect. All reports processed for *STAR* were microfilmed and

the pages arranged in a microfiche. The microfiche copy was distributed 4-6 days in advance of the journal ensuring that the articles abstracted were available locally when *STAR* reached its users. The use of microfiche was economical for reproducing copies of documents compared to the cost of reprinting. It was quickly produced and so a practical means of maintaining locally large collections of documents, especially since it was tailor-made for compact storage and fast retrieval. In 1963, NASA and AEC had agreed on a standardized microform. COSATI recommended adoption of this standard by all Federal agencies in the same year. Thus all scientific and technical reports of the Federal government would be produced henceforth in a form that could be viewed and reproduced on the same equipment. As most European producers had adopted the same standard, cooperation between Europe and the United States in the interchange of microfiche was greatly facilitated. By the end of the year NASA was providing to the Clearinghouse for Federal Scientific and Technical Information for public sale microfiche copies of unclassified NASA reports announced in *STAR*.

The volume of aerospace scientific and technical literature acquired from foreign sources increased notably in the year. The agency by that time had technical cooperation agreements with 23 governments and three international organizations; and publications exchange arrangements with 195 organizations in 38 countries including government agencies, professional societies, academic institutions, research institutes and libraries. In 1964, 7,200 foreign items were provided to NASA organizations and contractors as compared with 4,200 in 1963. With the increase in volume of NASA scientific and technical literature, the agency increased its efforts to improve the quality of the publications. Guides for the preparation of contractor reports and a NASA publication manual were issued.

In 1965 the Division of Scientific and Technical Information created further procedures to increase the exchange of information-processing data with other government agencies, reduce unit cost and provide tighter management control. In these efforts an arrangement was concluded with the Defense Documentation Center to exchange worksheets used in processing incoming items and tapes. The Division also arranged for the Clearinghouse for Federal Scientific and Technical Information to receive for public sale copies of non-copyrighted foreign scientific and technical documents originally acquired by NASA. The agency also began to explore with others the possibility of a control searching system with which local and dispersed installations could communicate directly and immediately. NASA also arranged to use the graphic art composing equipment developed by the National Library of Medicine to index *STAR*. In the first phase of an enlarged scientific and technical information program for engineers, NASA set up a central service to provide information on research and development specifications originating in or outside the agency.

By the end of 1966, NASA's computerized scientific and technical information system included 500,000 items of aerospace literature and

was growing at the rate of 100,000 items annually. The information system had matured to the point that tests of its procedures were being made and tools refined.

In 1967, the Division of Scientific and Technical Information concentrated on expanding its services by supplying management information to program managers. The information in data banks on current research projects (objectives, procedure, personnel, costs) was used increasingly by research managers and workers. Three other notable advances were made by the Division during the year. A new thesaurus was published to provide a standardized list of terms for indexing and retrieving documents. The *NASA Thesaurus* was developed in collaboration with the Department of Defense which insured effective communication with that Department and the Engineers Joint Council. By the end of the year NASA also finished a series of tests of its planned RECON System for remote console interrogation of a large information bank on a real time basis.

The third development of the year was a refinement of the selective dissemination of information (SDI) program begun in 1963. The conventional SDI had proved relatively expensive vis a vis simple current awareness methods such as circulating copies of abstract journals for large user populations. It was found that many of the individual profiles were similar and could be grouped into standard profiles. A new current awareness system, *Selected Current Aerospace Notices (SCAN)* was created in which the matching was with standard profiles of selected topics which was an order of magnitude less expensive than the original conventional SDI systems.

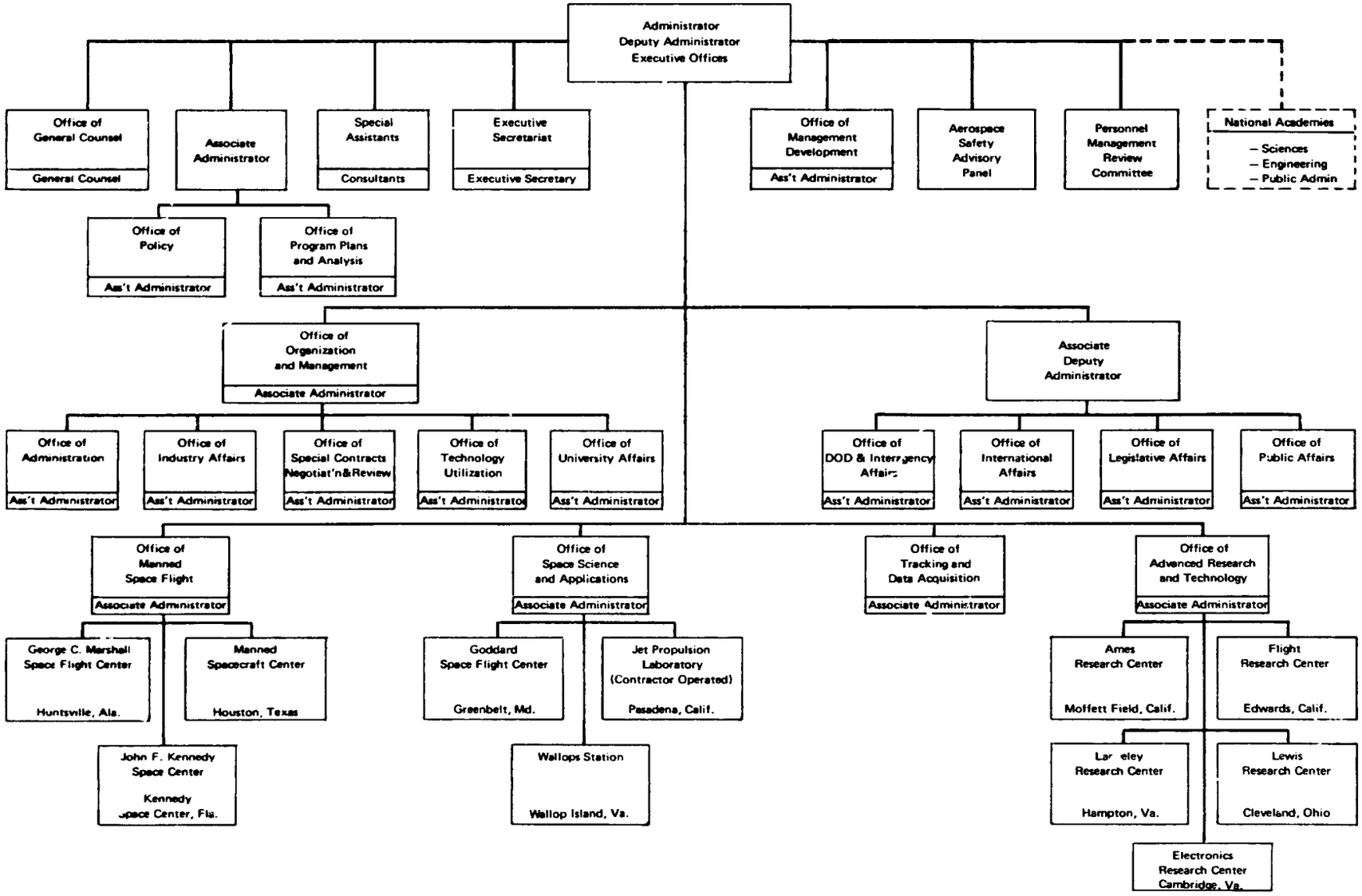
Summary

The present information program, based on the operating principles and organization adopted in 1962, is large, efficient, and sophisticated--and has been the instrument by which NASA has both discharged its responsibility for dissemination of information concerning its activities and acquired the information required by its programs. To summarize the present state of the system, it is administered by the Division of Scientific and Technical Information in the Office of Technology Utilization. The office of Technology Utilization, headed by an Assistant Administrator, is a component of the Office of Organization and Management directed by an Associate Administrator. The current NASA organization is shown in Table I-1.

The Scientific and Technical Information Division now includes five branches:

Acquisition and Dissemination
Technical Publications
Information Services
Systems Development
Program Coordination

TABLE I-1. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



The current organization chart of the Division is shown in Table I-2.

The principal products and services of the Division include:

- Technical publications (Technical Reports, Technical Notes, Contractors Reports, Technical Translations, Tech Briefs, Special Publications.)
- Announcement Media (*Scientific and Technical Aerospace Reports--STAR* and *International Aerospace Abstracts--IAA.*)
- Document Services. Distribution in hard copy, microfiche or facsimile.
- Literature Searches
- Bibliographies
- Selective Dissemination of Information (SDI and SCAN)
- Real-Time on-Line Dialog Searching (RECON)

The NASA collection of aerospace information now includes more than three-quarters of a million separate items. In addition, about 200,000 documents pre-date 1962 and are under conventional library controls. The rest of the collection--reports, journal articles, books and proceedings are under computer control. The collection has increased at the rate of more than 70,000 documents a year including about 10,000 acquired through foreign document exchanged agreements.

In 1967 the distribution of *STAR* was almost 10,000 copies and *IAA*, 4,000. Approximately 2,000 literature searches were made at the central facility with thousands of additional searches being made by those organizations receiving NASA computer tapes. Nine million microfiche were produced and distributed. In the year, 118 special publications were issued with a total press run of 563,900 copies. The users of the products and services of the Division were classified as:

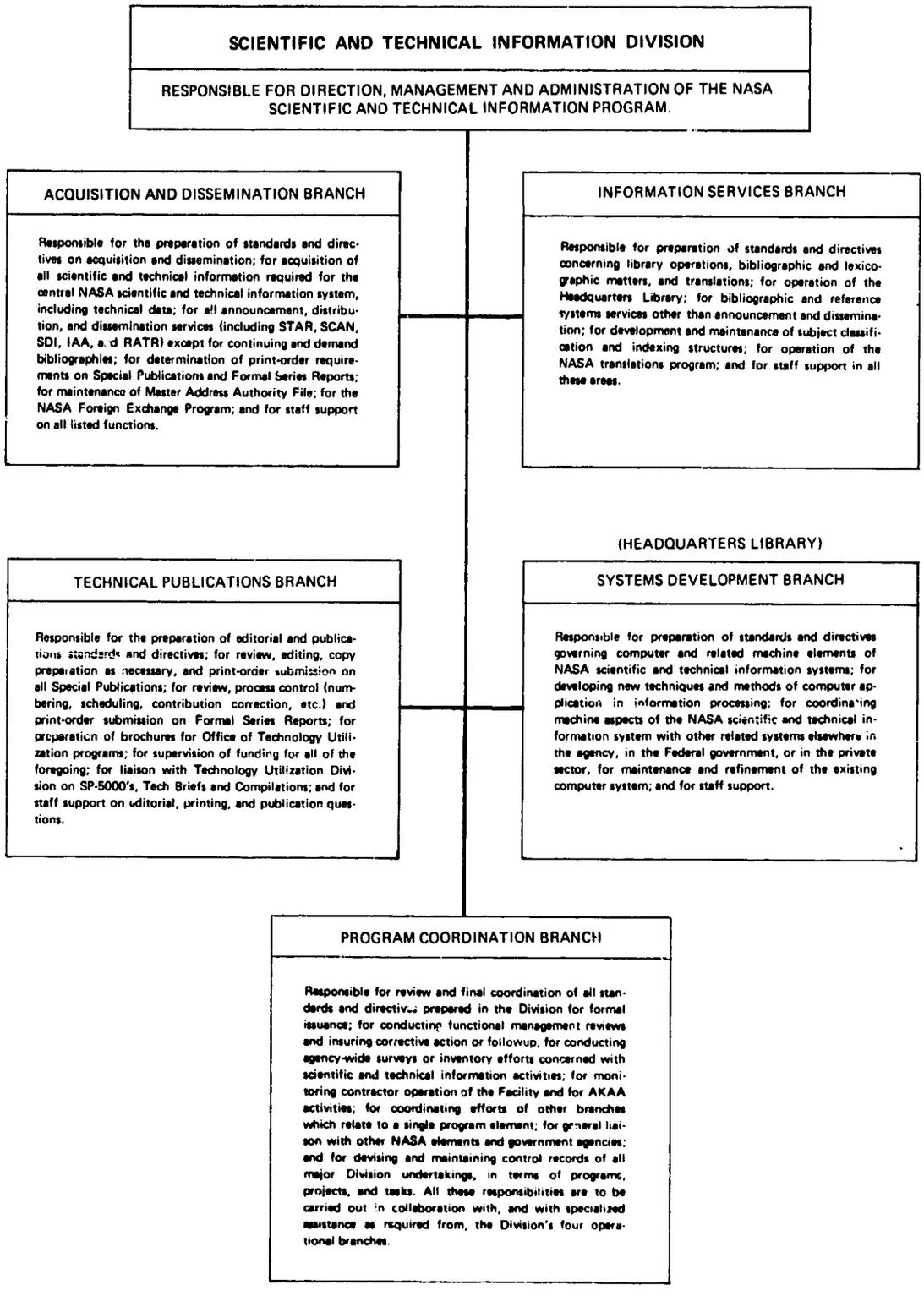
NASA	38%
Industry Contractors	22%
Academic	21%
Other Government	12%
Foreign	7%

The budget for the Division of Scientific and Technical Information has grown from $1,442,000 in fiscal year 1962 to an estimated $7,686,000 in fiscal year 1969. The capital investment for the Facility (including equipment and building alterations) has grown from $1,260,000 in 1962 to an estimated $4,785,000 in fiscal year 1969. The budget for the NASA Headquarters Library in 1969 was $206,000.

TABLE I-2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

OFFICE OF TECHNOLOGY UTILIZATION



The staff of the Division of Scientific and Technical Information included 36 professional and 19 clerical positions as of February 4, 1969. Table I-3 presents the training of the professional staff members. The table shows that the staff of 36 includes persons with training in 21 fields other than library science. More staff members--seven--were trained in engineering, while five listed library science as their primary professional training and four as a secondary field. Two staff members were drawn from each of the fields of accounting, journalism and political science.

For the purposes of this study a special note should be added on the role of libraries in the NASA information system. As noted above, the Division of Scientific and Technical Information includes a Headquarters Library in its Information Services Branch. This Headquarters Library was established in 1918 by the Office of Aeronautical Intelligence of the National Advisory Committee for Aeronautics. According to the *Sixth Annual Report of the National Advisory Committee for Aeronautics*, its functions were "the collection, classification and diffusion of technical knowledge on the subject of aeronautics to the military and naval air services and civil agencies interested, including especially the results of research and experimental work conducted in all parts of the world."

Since the National Aeronautics and Space Administration succeeded the National Advisory Committee for Aeronautics in 1958 the Headquarters Library has existed primarily to support Headquarters personnel by offering various information services including reference, subject searches, interlibrary loan, procurement, announcement of new accessions, photocopy and dissemination of information materials.

Each of the NASA field libraries was established by either NACA or NASA as part of its respective installation and is administratively a part of that installation. The functions of each field library are similar to those of the Headquarters library. Some of the field libraries are automated, such as those at the Electronic Research Center and Goddard Space Flight Center. All NASA libraries utilize the tools, services and products of the NASA Scientific and Technical Information System and accordingly rely on the resources of the NASA Facility.

The NASA Headquarters Library is small and conventional. Its holdings are approximately 200,000 books and journals. In addition it has all NASA documents and microfiche. The collections of the library have been limited by NASA's policy of using the library resources of other agencies rather than attempting to duplicate their collections.

The staff of the library includes nine positions of which five are professional. The position of head librarian is rated at GS13 (the position of Chief of the Division of Scientific and Technical Information is a GS15).

Operationally, while the Headquarters Library is a part of the Division of Scientific and Technical Information it also is one of its customers.

Table I-3. National Aeronautic and Space Administration
Division of Scientific and Technical Information
Staff Positions and Training of Professional Staff
As of February 4, 1969

I. Staffing

Professionals	– 36
Clerical	– 19

II. Professional Training

1. Accounting	2
2. Business Administration	1
3. Business Administration and Library Science	1
4. Chemistry	5
5. Chemistry and Library Science	1
6. Chemistry and Public Administration	1
7. Education	1
8. Engineering	3
9. Engineering and Foreign Service	1
10. Engineering and Library Science	1
11. Engineering and Mathematics	1
12. English and American Literature	1
13. Foreign Languages	1
14. Journalism	2
15. Library Science and English	1
16. Library Science and History	2
17. Library Science and Literature	1
18. Library Science and Mathematics	1
19. Military Science	1
20. Political Science	2
21. Physics	1
22. Pre Law and Information Science	1
23. Pre Med and Literature	1
24. Public Law and Library Science	1
25. Writer and Editor	1

Conclusions

The establishment and development of NASA's Scientific and Technical Information System has been based on certain definite concepts of the agency's administrators. The primary concept was that NASA had to have a large-scale, computerized management information system to supply its unusual needs and discharge its statutory obligations. These needs and obligations were such that management decided, for the reasons discussed above, that they could not be met by a conventional special library, however expanded and restructured. Instead, a library was considered an essential part of a total information system.

Second, NASA's administrators, particularly Messrs. Glennan, Webb and Dryden, gave the information system high priority from the establishment of the agency. In fact, the system was conceived, designed and has been directed by the agency's administrators and information managers--not its librarians. The importance attached to information resulted in the Division of Scientific and Technical Information being given a position in the agency much higher than that usually accorded to the Government's libraries. Further, the top-level support of the information system has given it adequate financing and staffing.

Third, the NASA information system is directed by men trained primarily in fields other than library science. To the NASA administration, professional training in its major program fields (e.g., engineering and chemistry) is necessary to understand and meet its information needs.

In this study, a first general question follows: why were NASA's librarians not given responsibility for developing and managing the information system? As reported by the administrators interviewed, the agency's librarians did not offer a plan for an information system in NASA's formative years. Rather, they did not seem to recognize the need for and tacitly opposed the expansion of information functions until they had lost the opportunity for initiative. Consequently, no consideration ever was given to organizing the information system within the library.

There are some specific reasons as to why the librarians of NASA did not supply the concepts and leadership to meet the information needs of the agency. To the NASA interviewees the government's libraries had not offered enough status, pay or opportunity to attract and hold persons with the ability to design and manage information systems. Consequently, NASA's librarians in 1958-1960 were considered operators, not managers, with little capacity for planning the essential information transfer programs.

Second, at the time of the creation of the NASA information program a substantial factor in choosing information managers from outside the library ranks was that few librarians were competent in electronic data processing.

Certain other factors did not obtain. Secrecy of data was not a factor--the National Advisory Committee on Aeronautics library had held and utilized much classified information. The "scientific" mission of

the agency was not a factor--librarians in NACA and other governmental agencies long had been collecting and processing such information.

Third, while in the opinion of Agency and Division administrators it was easier to obtain funds for the creation of an information system that it would have been to expand the library with its "archival" image, this was not a primary reason for the creation of the Division of Scientific and Technical Information.

The second general question in this study of the Division of Scientific and Technical Information is that of how its mission differs from the Federal Library mission. The interviewees gave generally similar answers to this question. First, there is, with one exception, no fundamental differences in mission in the sense that both the Division and the Federal Libraries exist to acquire and store information and make available to the public the results of its research which has caused the Division to create and maintain a large publishing and sales program.

There are, however, certain substantial differences in the programs of the Division of Scientific and Technical Information and those of the great majority of Federal Libraries. First, while the Division like any library is engaged in acquiring, storing, and retrieving information its activities are of exceptionally large scale. The coverage for both acquisition and distribution is world-wide. The factor of scale has been very significant in the development of the system and led to the exceptional automation of the programs in comparison to those of most libraries.

Second, the Division of Scientific and Technical Information has concentrated its principal efforts on acquiring and disseminating report literature. It has not ignored information in books and journals and other more traditional forms, but NASA's programs have required primarily use of contemporary research reports. Thus the subject matter of the Division's principal programs differs basically from that of most libraries.

Third, to acquire research reports the Division has had to pursue them vigorously and even provide for their creation in useable form. Thus it is fair to say that the Division is engaged in creating information rather than only collecting and disseminating it.

A fourth distinction, and one of particular significance, is the evaluation of information by the Division. By selecting research reports for announcement, and by abstracting and indexing them, the Division makes very significant evaluations of information for the agency. Further evaluations are made in state-of-the-art reports. These evaluations that are of great value to NASA programs in that they greatly facilitate the use of information by staff and contractors.

A fifth distinction is the greater extent to which the Division is consumer-oriented. From the establishment of its programs in 1962 the Division has been engaged in efforts to make its programs ever more useful to their consumers. These efforts have included the selective

dissemination of information program (SDI), its successor the SCAN program, and the present experiments with personal remote consoles (RECON). SDI may be, as one interviewee remarked, an enlargement of "buckslips" by computer but the difference seems so large as to be a distinction.

Sixth, the public of the Division of Scientific and Technical Information is much greater than that of most special libraries in that it includes the general public as well as agency staff and contractors. This difference in the size of the clientele has been a basic factor in determining the programs of the Division.

Seventh, there is a difference in staff--and therefore in attitude--between the Division and the traditional libraries. The Division was created and is directed by information managers and technicians rather than librarians. These men are knowledgeable of traditional library procedures but their emphasis has been on communication of information. They admit that most of their techniques--selective dissemination of information systems, coordinate indexing, microfiche, et al.--are not new in more than a formalistic sense. Rather, they are extensions or refinements of procedures known and used in the library world. However, the extensions and refinement have been made with primary consideration of user needs and problems, with vigor and with imagination. These developments and their success suggest a meaningful difference in attitude and atmosphere. A further important factor in considering the Division's ppersonnel is the emphasis on selection of persons who by training and experience understood the problems of and could communicate with the agency's program managers.

Eighth, the leaders of NASA's information system believe their future objectives are substantially different than those of most library leaders. They believe that the future system must attempt to provide information itself. While direct answer capability in a full sense is considered to be years away, still it is a goal they expect to attain.

The objectives, organization, programs and staff of the Division of Scientific and Technical Information suggest that NASA's information program is generally an extra-library one. Its development, its success and the value placed on it by management have basic implications for the Federal Libraries and their staffs and for the planning and organizing of information systems in the government.

FOOTNOTES

1. U.S. National Aeronautics and Space Administration, *Semi-Annual Report to Congress, Oct. 1, 1960-June 30, 1961*, pp. 170-172 (U.S. Government Printing Office, Washington, D.C., 1961).

2. NASA, *The Scientific and Technical Information Program of the National Aeronautics and Space Administration*, April 1962.

3. NASA, *The Scientific and Technical Information Program of the National Aeronautics and Space Administration*, April 1962.

II. THE NATIONAL STANDARD REFERENCE DATA SYSTEM OF THE NATIONAL BUREAU OF STANDARDS

The compilation and evaluation of technical information always has been essential to the progress of science and technology. While there have been some systematic compilation and evaluation activities since the earliest days of recorded science, the first comprehensive program within the United States was initiated some 40 years ago by the National Academy of Sciences when it sponsored the production of the International Critical Tables. These works still are widely consulted although no provision was made for the continuation of the program. A considerable number of compilation and evaluation activities were initiated in the succeeding years in various places throughout the world. In the United States, the Office of Critical Tables was established in 1955 in the National Academy of Sciences--National Research Council to encourage the formation of new critical evaluation groups, to develop standards of criticality, to maintain current knowledge of compilation efforts, and to participate in the development of international standards of units and nomenclature. The Office of Critical Tables had only advisory powers; it did not undertake specific programs.

In 1963, the Federal Council for Science and Technology decided that existing provisions for compilation and evaluation efforts were no longer adequate to the needs of the technical community of the country. The decision of the council recognized the rapid growth of technical research and development during the preceding twenty years and the resulting problems of improving the transfer of scientific and technical information from organization to user. For example, *Chemical Abstracts* published one million abstracts in its first thirty-two years of operation, a second million in the next seventeen years and a third million in the following eight years. Further, the National Science Foundation estimated at that time that approximately 30,000 technical journals were being published throughout the world from which useful quantitative information in the physical sciences might be obtained. The problems recognized by the Council included that of how an individual covers a large amount of literature and also that of making judgments on the value of reported research.

In order to facilitate the access of scientists and engineers to evaluated data, the Federal Council for Science and Technology in 1963 recommended to the Director of the President's Office of Science and Technology that a coordinated, government-wide effort be made to improve the compilation and evaluation of the data of physical science. This recommendation was an endorsement of a proposed plan of action which had been developed by a committee of staff members of the National Bureau of Standards, appointed for that purpose by the Director of the Bureau. The proposed plan was for a decentralized program, conducted by many individuals and groups in the country, with central coordination by the National Bureau of Standards. The program was envisioned as permanent, but with changing emphasis in accordance with the requirements of users of quantitative data in the physical sciences.

Preceding page blank

Dr. Jerome Wiesner, then Director of the President's Office of Science and Technology, accepted this recommendation in June 1963, and issued a Federal Policy statement creating a National Standard Reference Data System with responsibility for its administration assigned to the National Bureau of Standards. NBS was considered the appropriate government organization to administer the NSRDS due to its statutory responsibilities for measurement science and technology and for the distribution of results of measurement. A copy of the *Federal Policy on the National Standard Reference Data System*, issued June 7, 1963, is given below. It is followed by a copy of a press release of the same date as the policy.

FEDERAL COUNCIL FOR SCIENCE AND TECHNOLOGY
COMMITTEE ON SCIENTIFIC INFORMATION
28 May 1963

Federal Policy on National Standard Reference Data System

There will be established a National Standard Reference Data System (NSRDS) to provide on a national basis critically evaluated data in the physical sciences. The NSRDS will consist of a National Standard Reference Data Center (NSRDC) at the National Bureau of Standards and such other Standard Reference Data Centers as may be required.

The National Bureau of Standards will be charged with the administration of the National Standard Reference Data System. This assignment will include the establishment of standards of quality, methodology including machine processing formats, and such other functions as are required to ensure the compatability of all units of the NSRDS.

The National Bureau of Standards will be charged with funding and administering the National Standard Reference Data Center. This Center will be an identifiable part of the National Scientific and Technical Information System (NSTIS).

Standard Reference Data Centers covering certain specific areas of effort may be established by or be assigned to the various Departments and Agencies in accordance with their specific desires and capabilities. Such Centers will be financed and administered by the Department to which assigned but will meet the quality standards and other requirements of the NSRDS. Such Centers will be included as identifiable components of the NSTIS.

The NSRDS may also include Standard Reference Data Centers at universities, research institutes, and other appropriate non-Government activities. To be

included in the NSRDS, such Centers will meet the quality standards and other requirements of the NSRDS and will be included as identifiable components of the NSTIS.

There will be an Advisory Board to review and recommend policy relative to the operation of the NSRDS. It will include among others, representation from the National Academy of Sciences, National Science Foundation, Federal Agencies engaged in research and development, and such other representatives of the scientific and technical community as the Director of the National Bureau of Standards may determine.

In establishing the NSRDS, the intent is to provide an articulated system of Centers and activities under such coordination and direction as to ensure an output meeting quality standards for national reference data in the physical sciences. The establishment of the System should not be construed as preventing the establishment of such Federal or Departmental Data Systems as are required for the collection of raw or evaluated data to serve engineering or operating needs of the Federal Government or various Federal agencies.

OFFICE OF SCIENCE AND TECHNOLOGY
EXECUTIVE OFFICE OF THE PRESIDENT
June 7, 1963

Dr. Jerome B. Wiesner, Director of the Office of Science and Technology in the Executive Office of the President, today announced the establishment of a National Standard Reference Data System. This national effort will be administered by the National Bureau of Standards, which is already compiling standard data. The System integrates to a single point of responsibility the present data-compiling activities of the National Bureau of Standards, Department of Defense, Atomic Energy Commission, National Science Foundation, and several other agencies.

The announcement follows the action taken by the Federal Council for Science and Technology, a government-wide group of top level agency officials in science and technology, based upon recommendations of its Committee on Scientific Information. According to Adm. Charles B. Martell of the Office of the Secretary of Defense, Chairman of the Committee on Scientific Information, the intent is to provide an articulated system of activities under such coordination and direction as to ensure a compilation of data meeting quality standards, and also to maintain continuous policy guidance of the system at the level of

the Executive Office. The need to improve scientific and technical information in the Federal government has been increasingly apparent during recent years.

In making the announcement, Dr. Wiesner, who is also Chairman of the Federal Council for Science and Technology, stated that the Standard Reference Data System will greatly benefit United States engineers and scientists by giving them easy access to the data pertinent to their work. The standard source for scientific data has been the now almost totally out-dated *International Critical Tables*, an eight-volume publication last issued in 1933. That data source was compiled under the auspices of the National Academy of Sciences, Office of Critical Tables, and published by the McGraw-Hill Book Company.

Under the new system the National Academy of Sciences will act as advisor to the National Bureau of Standards, providing the guidelines to the fields of science and technology having greatest demand for data.

In recent years the mass of available data resulting from the stepped-up Federal research and development programs, has become much too large to be handled by a private publishing venture. Also, the flow of new data requires continuing efforts to update collections. Only a national system is able to cope with this information flow.

Under the plan for the new system, the data will be published in much smaller collections than in the old *International Critical Tables*. In this form, the data will be more responsive to the dynamics of modern research and development.

Detailed plans for the system components are presently being developed by the several participating agencies and the National Academy of Sciences. One set of these plans will be the subject of an all-day meeting on June 20, 1963, sponsored by the Office of Critical Tables, National Academy of Sciences.

The first objective of the new organization was the integration of existing data compilation and evaluation activities in the National Government. Technical coverage was to be supplemented and expanded as necessary. Standards were to be established and maintained for the output of the various groups and mechanisms were to be created as required for the dissemination of the output. Thus the National Standard Reference Data System was envisioned as the total Federal effort toward systematic production of compilations of critically evaluated quantitative data on the physical properties of substances and materials.

The assignment thus given the National Bureau of Standards by the Office of Science and Technology included the following responsibilities:

- Operation of a National Standard Reference Data Center at the National Bureau of Standards.

- Coordination of standard reference data activities of the National Bureau of Standards, Department of Defense, Atomic Energy Commission, National Aeronautics and Space Administration, National Science Foundation and other governmental agencies, all of which could operate components of the National Standard Reference Data System, if such action were mutually decided to be appropriate.

- Establishment of standards of quality for various products of the National Standard Reference Data System.

- Establishment of standards of methodology, including machine processing.

- Establishment of standards for such other functions as are required to ensure the compatability of all units of the National Standard Reference Data System.

The responsibility for administration of the National Standard Reference Data System was originally assigned within the National Bureau of Standards to the Institute for Basic Standards. The Institute for Basic Standards also included the following units: Office of Measurement Services, Applied Mathematics Division, Electricity Division, Mechanics Division, Metrology Division, Heat Division, Atomic and Molecular Physics Division, Radio Standards Physics Division, Radio Standards Engineering Division, Frequency Division, Laboratory Astro-Physics Division, Cryogenics Division. The Director of the Institute reports directly to the Director of the Bureau.

In 1964, Dr. A.V. Astin, Director of the National Bureau of Standards, described the National Standard Reference Data System as "a governent-wide effort to give to the technical community of the United States optimum access to the quantitative data of physical science, critically evaluated and compiled for convenience."[1]

In 1968, the NSRDS was termed "a sub-system within the concept of a national measurement system which is envisioned as comprising a central core of national standards of measurement, a set of consistent instruments, a body of reference data that provides users with ready-made answers to questions on properties of substances and finally the entire set of meaningful measurements made throughout science, technology and the economy. From this viewpoint, NSRDS is a portion of the activities leading to dissemination of readymade data for use by the technical community of the United States."[2]

The basic philosophy of the operation of the National Standard Reference Data System is that the program is a cooperative endeavor of

the entire technical community of the United States. Its premise is that preparation of compilations of critically evaluated property data is of vital interest to nearly every technical man in the practice of his profession and the needs and wishes of these men are to be determining factors in the guidance of the system. Most technical agencies of the government have found it necessary to sponsor data compilation activities of the type appropriate to the NSRDS in order to fulfill the requirements of their missions. The activities, by virtue of their existence, are part of the total complex making up the National Standard Reference Data System. Thus, the National Bureau of Standards does not claim ownership of the NSRDS but has coordinating and contracting responsibility for the NBS role in the system. It is to be noted particularly that NSRDS does not have direct operational responsibility for the data centers within and without NBS that constitute the NSRDS.[3]

The NSRDS has been conducted, since its establishment, as a decentralized operation of nation-wide scope with central coordination by NBS. It is a complex of data centers and other activities, carried on in government agencies, academic institutions and nongovernmental laboratories. The individual operational status of existing critical data projects in maintained and encouraged. Data centers that are components of the NSRDS produce compilations of critically evaluated data, critical reviews of the state of quantitative knowledge in specialized areas, and computations of useful functions derived from standard reference data.[4]

The office of Standard Reference Data is now engaged in three major types of activities:

First, projects for compiling data of the physical sciences in several broad technical areas: (1) nuclear properties, (2) atomic and molecular properties, (3) solid-state properties, (4) thermodynamic and transport properties, (5) chemical kinetics, (6) colloid and surface properties, and (7) mechanical properties.

Second, information-systems research and design.

Third, the provision of various specialized information services to the technical community.

Data Compilation Projects

In the data compilation program "Standard Reference Data" is defined as critically evaluated, quantitative information relating to a property of a definable substance or system. The conduct of the data compilation projects includes, first, the establishment of priorities for the collection and evaluation of data. Second, the program managers in the seven fields listed above are responsible for evaluating proposals for the establishment of data centers. Most of the proposals are unsolicited although a few are initiated by the Office. The proposals generally come from individual, universities and government laboratories with a few being received from industry. No projects are conducted by

the respective program managers of the office. Instead, projects approved by them are funded by the National Bureau of Standards and generally monitored. The procedures of "critical evaluation" vary with the projects. In some data centers the experimental techniques are reviewed, calculations are spot checked, values of the fundamental constants are checked, and the limits of experimental uncertainty are independently assessed. In all projects the provisions for continuity of effort are emphasized.[5]

In making program decisions, the Office of Standard Reference Data seeks the advice of the American technical community. The Executive Committee of the Office of Critical Tables of the National Academy of Sciences--National Research Council has served as a general program review committee for the work of the Office. The Executive Committee has been both a source of policy recommendations and a channel of communication with the technical community. The Office also has created panels of specialists in each of its technical program areas and participates in international data compilation activities, particularly through the Committee on Data for Science and Technology of the Internationa Council of Scientific Unions. Obviously, the administration of the NSRDS is closely related to the needs of the technical community.

The products of a data evaluation center include indexed bibliographies, uncritical data compilations, critical reviews, critical data compilations, criteria, recommendations, solutions to problems and correlations. All current projects are listed in the *Status Report of the National Standard Reference Data System*, issued as National Bureau of Standards *Technical Note* 448 in April, 1968.[6] Under the legislation passed in 1968, the Office of Standard Reference Data plans to copyright and publish the results of the projects it supports.

The great majority of the funds available to the Office of Standard Reference Data are expended for data evaluation projects with approximately 80 per cent of the annual budget being devoted to this purpose.

Information Services

The second major activity of the Office of Standard Reference Data is the provision of specialized information services to the technical community. The Information Services section, which includes a library, provides four types of service:

1. A data file is maintained in the Library of the OSRD which includes approximately 1,000 documents. This collection of worldwide data compilations is one of the most extensive in the world.

2. Compilation Publication Services. This Section is an editorial intermediary between OSRD, associated data centers and other individuals and groups producing data compilations and the publishers of data including the Government Printing Office. Technical editing is a major service.

The publication program is a basic activity of the Office of Standard Reference Data, the publications being the major vehicles for making data available to the public. At present, there are 27 issues of the principal NSRDS-NBS Series with several others in preparation. A second vehicle for the publication of data by the OSRD is its *Technical Note* series of which 12 have been issued. The Office also publishes a newsletter which now has a circulation of approximately 4,000.

3. An inquiry service, which in 1969 will, it is estimated, provide either substantive answers or referrals to approximately 1,000 individuals.

4. A continuing analysis of user relations to determine who are the users, what their needs are, and means of meeting them.

The Library of the Office of Standard Reference Data, established in 1965, is not a branch of the main library of the Bureau of Standards but is considered an integral part of the Office. As such, it is an important component of the National Standard Reference Data System. It is strictly reference in nature and does not circulate books. The present holdings number about 1,200 including, as noted above, approximately 1,000 documents specifically within the character of the mission of the Office. The holdings also include some general reference volumes and punched cards. Obviously, the acquisitions have been limited to data on the physical properties of materials.

The sole librarian, who has a bachelor's degree in science education, considers her primary function to be that of a reference aide. At present the library receives three or four inquiries a week and the number is expected to increase steadily. Approximately one-half of the inquiries come from the Office of Standard Reference Data and the rest from other units of the Bureau.

The relations of the OSRD Library with the main library of the Bureau of Standards apparently are mutually satisfactory. The OSRD librarian uses the main library collections to a limited extent in answering inquiries. She also orders books through the main library and attempts to limit duplication of its holdings. The main library also is asked occasionally for technical assistance. The attitutde of the main library toward the OSRD library is discussed below.

Data System Design

The third general activity of the Office of Standard Reference Data is data system design. The Data Systems Design and Development Section, with a staff of five professionals, is concerned with the problems of handling data throughout the entire flow process. The use of computers for all practical operations is emphasized although such efforts to speed the flow of data from the measurer to the user have only just begun.

Current projects of the Section include general purpose programming, programming for all Bureau publications, computerized typesetting and data storage and retrieval. A major objective is the development of computerized data banks. The unit also gives advisory services to NSRDS data centers.

The current organization chart of the Office of Standard Reference Data is shown in Table II-1.

A general review of the professional staff of the Office of Standard Reference Data reveals that the organization is conducted almost wholly by scientists, the only exception being the librarian who has a degree in science education.

The National Standard Reference Data program was initiated in 1964 with funds transferred from the Atomic Energy Commission, the Department of Defense, the National Aeronautics and Space Administration and the National Science Foundation.

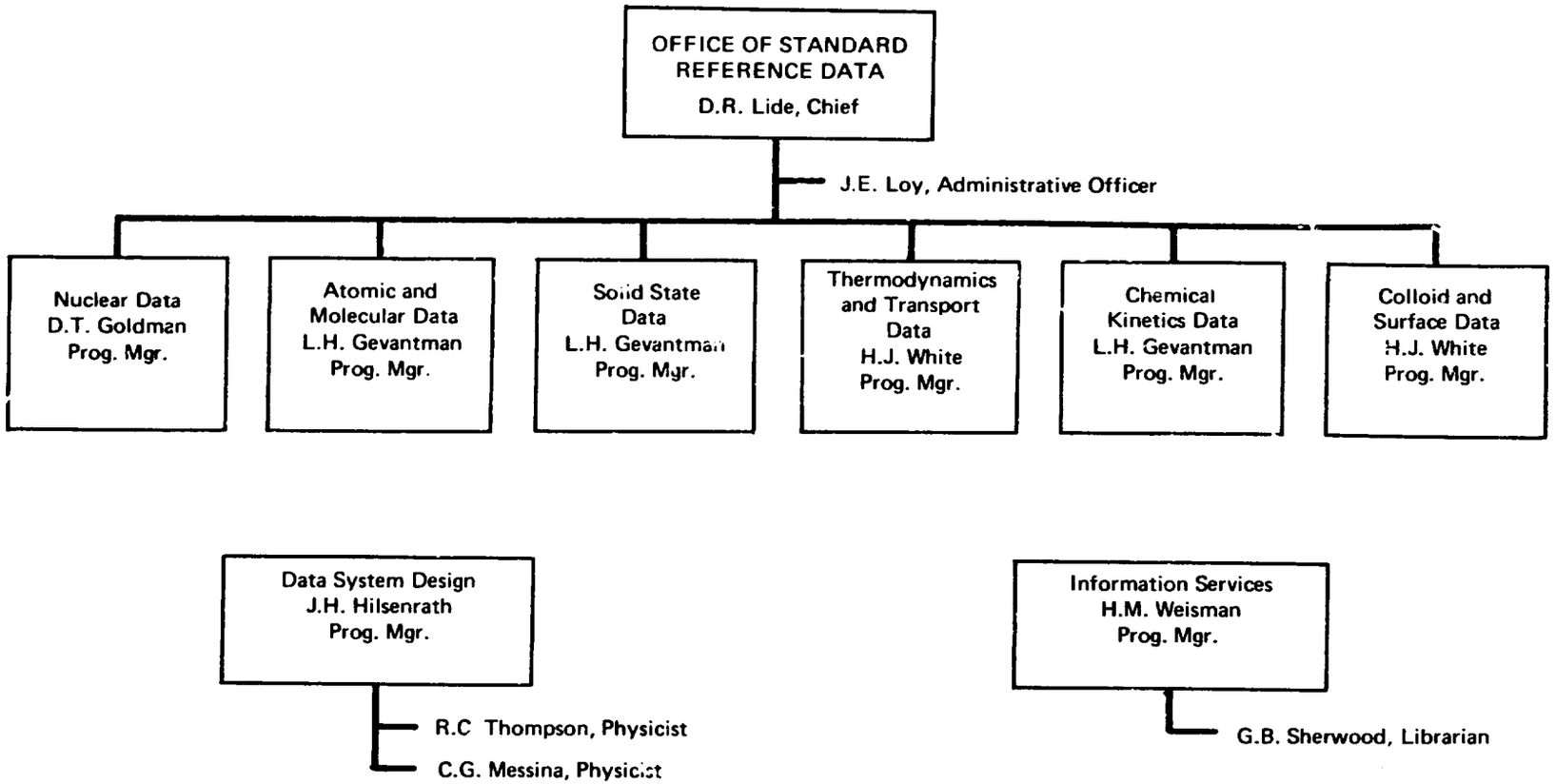
The appropriations for the Office of Standard Reference Data have risen steadily since the first was made in 1964. The appropriations for the office are as follows:

FY 1964	$ 612,000
FY 1965	1,161,000
FY 1966	1,370,000
FY 1967	1,495,000
FY 1968	1,857,000
FY 1969	1,860,000

The Standard Reference Data Act

After the first three years of operation of the National Standard Reference Data System, it was realized by the National Bureau of Standards that while the activity had been successful, additional legislative authority would enable the program to be expanded with increased efficiency. Thus, the Department of Commerce submitted a draft of the desired legislation to the 89th Congress. While a bill was passed by the House of Representatives in August, 1966, it was not passed by the Congress until July 11, 1968. The Standard Reference Data Act is of primary significance in the maintenace and development of the National Standard Reference Data System. It contains, first, a declaration that it is the policy of the Congress to make critically evaluated reference data readily available to scientists, engineers, and the general public. Second, the Secretary of Commerce was directed to provide or arrange for the collection, compilation, critical evaluation, publication, and dissemination of standard reference data. Third, the Secretary of Commerce was directed to prescribe standard criteria and procedures for the preparation and publication of standard reference data. Fourth, the Secretary was authorized to sell standard reference data and to allow the proceeds to be used by the Bureau. Fifth, the Secretary was authorized to copyright on behalf of the United States standard reference data prepared or made available under the Act.

TABLE II-1. ORGANIZATION CHART
OFFICE OF STANDARD REFERENCE DATA



June 19, 1969

The Standard Reference Data Act very substantially strengthened the National Standard Reference Data System and, in fact, made it one of the few information systems of the National Government with specific legislative authority. A copy of the Act follows.

Creation of the Office for Information Programs

Shortly after the passage of the Standard Reference Data Act of 1968, the National Bureau of Standards began to plan a reorganization of its information functions to create a better system for the transfer of technical information which is part of the responsibility of every professional staff member of NBS. Some of the programs affected had been in operation during the entire history of the NBS. Regrouping of them was expected to increase their efficiency and potential service. The reorganization reflected the basic concern of NBS with technology transfer and the belief that it must have an integrated technical information program.

The new organization created January 1, 1969, was titled the Office of the Associate Director for Information Programs, with the Associate Director Reporting to the Director of the Bureau. Its official mission statement follows:

Public Law 90-396
90th Congress, H.R. 6279
July 11, 1968

AN ACT

To provide for the collection, compilation, critical evaluation, publication, and sale of standard reference data.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

DECLARATION OF POLICY

Section 1. The Congress hereby finds and declares that reliable standardized scientific and technical reference data are of vital importance to the progress of the Nation's science and technology. It is therefore the policy of the Congress to make critically evaluated reference data readily available to scientists, engineers, and the general public. It is the purpose of this Act to strengthen and enhance this policy.

DEFINITIONS

Sec. 2. For the purposes of this Act--

(a) The term "standard reference data" means quantitative information, related to a measurable physical or chemical property of a substance or system of substances of known composition and structure, which is critically evaluated as to its reliability under section 3 of this Act.

(b) The term "Secretary" means the Secretary of Commerce.

Sec. 3. The Secretary is authorized and directed to provide or arrange for the collection, compilation, critical evaluation, publication, and dissemination of standard reference data. In carrying out this program, the Secretary shall, to the maximum extent practicable, utilize the reference data services and facilities of other agencies and instrumentalities of the Federal Government and of State and local governments, persons, firms, institutuions, and associations, with their consent and in such a manner as to avoid duplication of those services and facilities. All agencies and instrumentalities of the Federal Government are encouraged to exercise their duties and functions in such manner as will assist in carrying out the purpose of this Act. This section shall be deemed complementary to existing authority, and nothing herein is intended to repeal, supersede, or diminish existing authority or responsibility of any agency or instrumentality of the Federal Government.

Sec. 4. To provide for more effective integration and coordination of standard reference data activities, the Secretary, in consultation with other interested Federal agencies, shall prescribe and publish in the Federal Register such standards, criteria, and procedures for the preparation and publication of standard reference data as may be necessary to carry out the provisions of this Act.

Sec. 5. Standard reference data conforming to standards established by the Secretary may be made available and sold by the Secretary or by a person or agency designated by him. To the extent practicable and appropriate, the prices established for such data may reflect the cost of collection, compilation, evaluation, publication, and dissemination of the data, including administrative expenses; and the amounts received shall be subject to the Act of March 3, 1901, as amended (15 U.S.C.271-278e).

Sec. 6. (a) Notwithstanding the limitations contained in section 8 of title 17 of the United States Code, the Secretary may secure copyright and renewal thereof on behalf of the United States as author or proprietor in all or any part of any standard reference data which he prepares or makes available under this Act, and may authorize the reproduction and publication thereof by others.

(b) The publication or republication by this Act, either separately or in a public document, of any material in which copyright is subsisting shall not be taken to cause any abridgment or annulment of the copyright or to authorize any use or appropriation of such material without the consent of the copyright proprietor.

Sec. 7. There are authorized to be appropriated to carry out this Act, $1.86 million for the fiscal year ending June 30, 1969. Notwithstanding the provisions of any other law, no appropriations for any fiscal year may be made for the purpose of this Act after fiscal year 1969 unless previously authorized by legislation hereafter enacted by the Congress.

Sec. 8. This Act may be cited as the "Standard Reference Data Act."

Approved July 11, 1968.

"The Office of the Associate Director for Information Programs promotes optimum dissemination and accessibility of scientific information generated within NBS and other agencies of the Federal Government; promotes the development of the National Standard Reference Data System and a system of information analysis centers dealing with the broader aspects of the National Measurement System; provides appropriate services to ensure that the NBS staff has optimum accessibility to the scientific information of the world; and directs public information activities of the Bureau."[7]

The operating units of the new office were:

Office of Standard Reference Data--staff, 14
Clearinghouse for Federal Scientific and Technical Information--staff, 309
Office of Technical Information and Publications--staff, 502
Library-staff, 22
Office of Public Information--staff, 5
Office of International Relations--staff, 3

The new Office of Information Programs is, as indicated by the respective staff lists above, a substantial organization. Since its establishment,

it has played an increasingly important role in the activities of the National Bureau of Standards. The current organization chart of the Office of the Associate Director for Information Programs is shown in Table II-2, and the current organization chart of the National Bureau of Standards is Table II-3. The creation of this office seems to indicate a trend in the organization of information programs in the Federal Government with libraries recognized as major components of such programs.

Conclusions

In considering the meaning of the establishment and development of the National Standard Reference Data System for the Library of the National Bureau of Standards and for Federal Libraries generally, there seem to be three principal factors: (1) the nature of the work carried on by the Office of Standard Reference Data, (2) the creation of the Office for Information Programs, and (3) the relation of the main Library to the Office of Standard Reference Data.

In regard to the first factor, the Director and professional staff of the Office of Standard Reference Data believe there are major distinctions between their activities and those of the Library. While they agree that they are engaged to some degree in the traditional library functions of reviewing literature, indexing, and the preparation and publication of bibliographies, they maintain that there are certain major distinctions between their program and that of a conventional library.

First, that the Office of Standard Reference Data is engaged primarily in creating new information. The examples as noted above are specific data compilations in the major fields of project efforts which include nuclear properties, atomic and molecular properties, thermodynamics and transport properties, solid state properties, and chemical kinetics and colloid and surface properties.

Second, that the information produced by the projects of the Office of Standard Reference Data is not of the kind usually created by libraries. The staff of the Office emphasized that it is distributing information, not information about information.

Third, that the processes employed by the Office are not traditional library ones. The primary processes are the review of projects, the making of grants, and the monitoring of operations.

Fourth, that the essence of the NSRDS program is the intellectual effort contributed by professional scientists during the critical evaluation process. The critical evaluation of quantitative data of the physical sciences has to be done by scientists and to the Office of Standard Reference Data the only possible approach to creating an adequate staff has been to teach scientists whatever was necessary of library techniques. To the Office the bibliographic activities are a necessary support function in its principal mission.

TABLE II-2. OFFICE OF THE ASSOCIATE DIRECTOR OF INFORMATION PROGRAMS

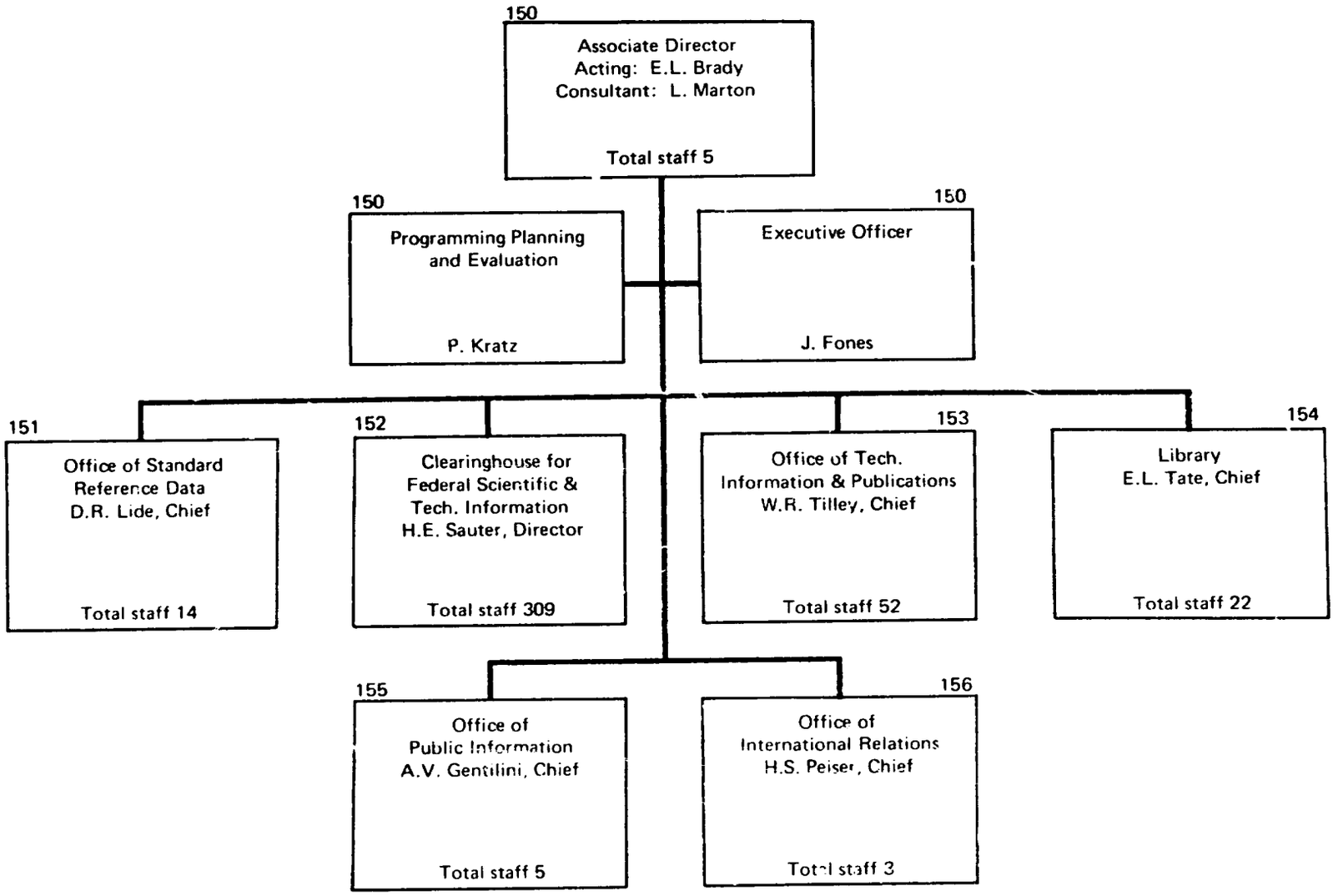
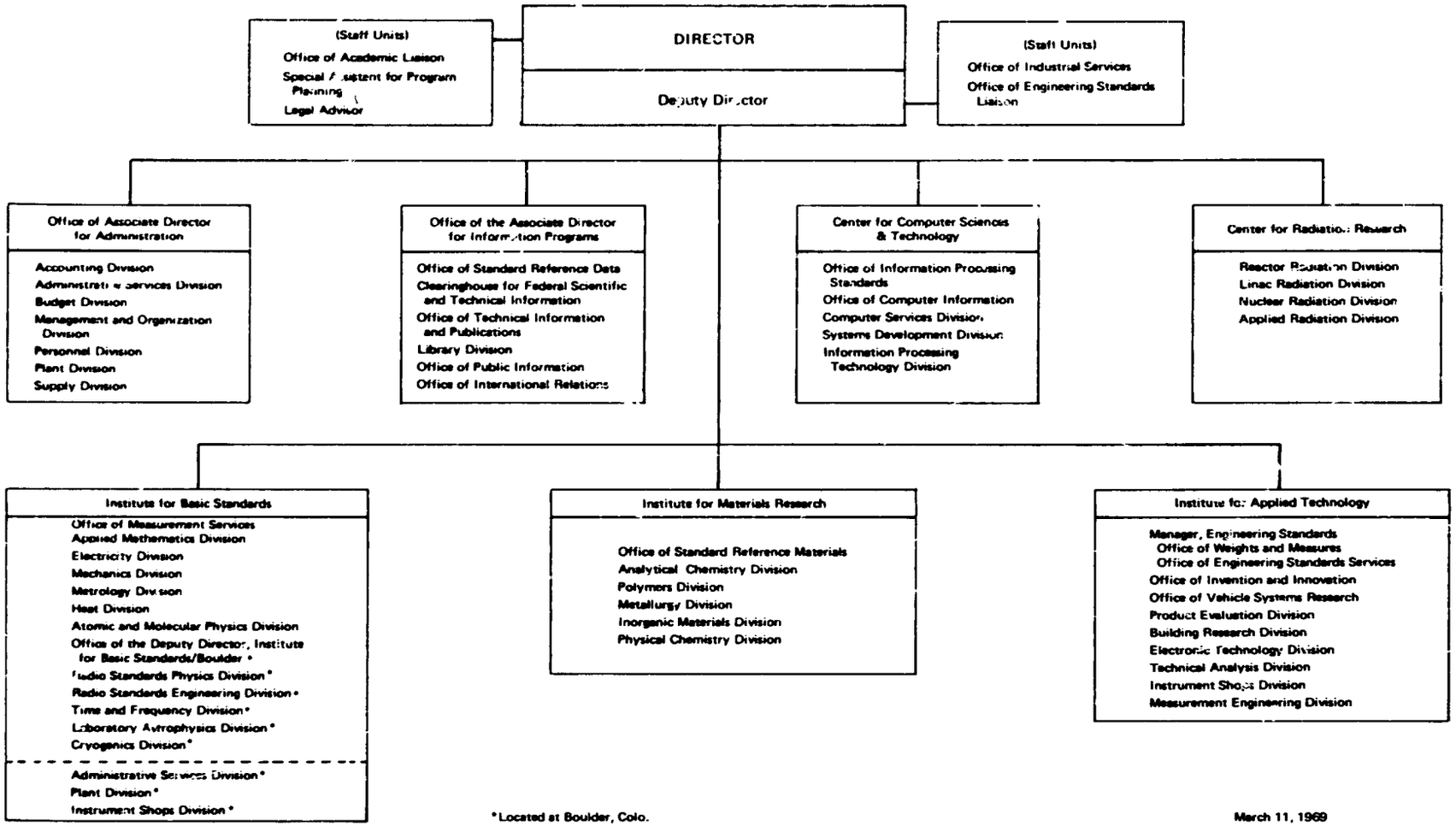


TABLE II-3. U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards



*Located at Boulder, Colo.

March 11, 1969

Fifth, that the publications program of the Office is considered to be of such a nature that it would not be carried on by a library because the documents produced are highly technical.

In discussing the organization of the Office of Standard Reference Data with Dr. Edward Brady, Associate Director for Information Programs of NBS, he stated that it would have been impossible to operate the NSRDS as a library function. He added that no consideration had been given to assigning the function to the library.

The second principal factor in considering the meaning of the National Standard Reference Data System for the Library of NBS is the creation of the Office for Information Programs on January 1, 1969. The creation of the Office reflected the belief of the Bureau that a Library as conventionally defined is one element in a total information program. The Office for Information Programs, as noted above, includes not only the Library of the NBS but also the Clearinghouse for Federal Scientific and Technical Information, the Office of Technical Information and Publications, the Office of Public Information, and the Office of International Relations. All of these activities are related and interdependent; thus, the Bureau has believed that they should be administered as parts of a whole. Dr. Brady in commenting on the transfer of the Office for Information Programs on January 1, 1969, states that its association with the other functions in the Office elevates the intellectual quality of the entire organization and keeps it from being mainly a collection of relatively mechanical functions.

The third factor is the position of the Library in the Office for Information Programs and, specifically, its relations with the Office of Standard Reference Data. In discussing this question with Dr. Elizabeth Tate, Head Librarian of the Bureau, she emphasized the following points. First, that the incorporation of the Library in the Office for Information Programs had given it greater status and support than it had when it was in the Office of Technical Support. The Library, she believes, now has better communication with the administration of the Bureau and there is better understanding of its needs. Further, the functions in the Office are compatible, interrelated, and mutually supportive--thus the Library now is associated with the other elements in the Bureau with which it has primary common interests. To Dr. Tate, the Library is indeed a part of the general information system of the Bureau.

In considering the functions of the Office of Standard Reference Data, Dr. Tate stated that she did not consider the evaluation of data of the physical sciences, the contracting process, the publication of data, and the efforts to further automate the evaluation and transfer of data to be conventional library functions. She did not consider the National Standard Reference Data System as a competitor of the library and was not disturbed by its independence. She added that she had never thought of putting the NSRDS in the library which she termed conventional. Rather, the main library uses the products of the System and is a main facility for dissemination of those products.

Dr. Tate considers the staff members of the Office of Standard Reference Data scientists engaged to some extent, but not primarily, in library functions. She believes that the OSRD staff needs greater training in library techniques and that her staff should participate more fully in the compilation of bibliographies. She also believes that her staff could provide more technical assistance to the OSRD in the publication and dissemination of information. Finally, she believes that her office should set standards for the preparation of bibliographies. It should be noted that OSRD does not itself prepare any bibliographies. The bibliographical work is done by the data centers which the Office supports.

On the specific question of the main Library's relations with the Bureau's divisional libraries such as that of the Office of Standard Reference Data, Dr. Tate did not object to their independence but believes that her office should establish standards for their organization and conduct.

In conclusion, the National Bureau of Standards believes it has perceived accurately the difficult distinctions between the operation of an information evaluation system and that of a library. The creation of the Office for Information Programs was a means, in part, of recognizing and conciliating the overlapping of library functions by information centers. Understanding of what seem to be significant planning and organizational efforts by NBS in this complicated area requires, first, recognition of the agency's belief that one of its primary functions is information transfer.

FOOTNOTES

1. Brady, E.L., and Wallenstine, M.B., *National Standard Reference Data System--Plan of Operation*, p. III (National Standard Reference Data Series, National Bureau of Standards--1, U.S. Government Printing Office, 1964).

2. *The National Standard Reference Data System*, p. 3 (U.S. Department of Commerce, National Bureau of Standards, Washington, D.C., 1968).

3. See National Bureau of Standards Technical Note 448: *Status Report National Standard Reference Data System*, p. 4 ff. (U.S. Government Printing Office, Washington, D.C., 1968).

4. Brady and Wallenstein, *op. cit.*, p. III.

5. National Bureau of Standards Technical Note 448, *op. cit.*, p. 5.

6. U.S. Government Printing Office, Washington, D.C.

7. U.S. Department of Commerce, Department Order 90-B, 12/11/68.

III. THE NATIONAL CLEARINGHOUSE FOR MENTAL HEALTH INFORMATION
OFFICE OF COMMUNICATIONS
NATIONAL INSTITUTE OF MENTAL HEALTH

The National Institute of Mental Health was established in 1949 "for the impovement of the mental health of the people of the United States."

The Institute is the principal agency in the Public Health Service for programs directed to the solution of social and cultural problems related to mental health and the biological and psycho-social factors that determine human behavior and development. The agency conducts and supports programs of research, manpower development and training, demonstrations and community service to promote and sustain mental health, prevent mental illness and treat and rehabilitate the mentally ill. It develops mental health standards, provides consultative and technical services to State and community agencies, and makes grants for the construction and staffing of community mental health centers and for the provision of preventive mental health services. The programs of the Institute also include the National Center for Prevention and Control of Alcoholism and Centers for the Study of Narcotic and Drug Abuse, Suicide Prevention, Crime and Delinquency and Metropolitan and Regional Mental Health Problems. It also supports and directly provides narcotic addict rehabilitation services.

The line units of the National Institute of Mental Health include the Divisions of Extramural Research Programs, Manpower and Training Programs, Mental Health Service Programs, Special Mental Health Programs, Narcotic Addiction and Drug Abuse, the National Center for Mental Health Services, Training and Research and the Intramural Research Program including Clinical and Behavioral Research and Biological and Chemical Research. The staff units of the Institute include the Office of Communications, which includes the National Clearinghouse for Mental Health Information and the Library of the Institute, the subjects of this study.

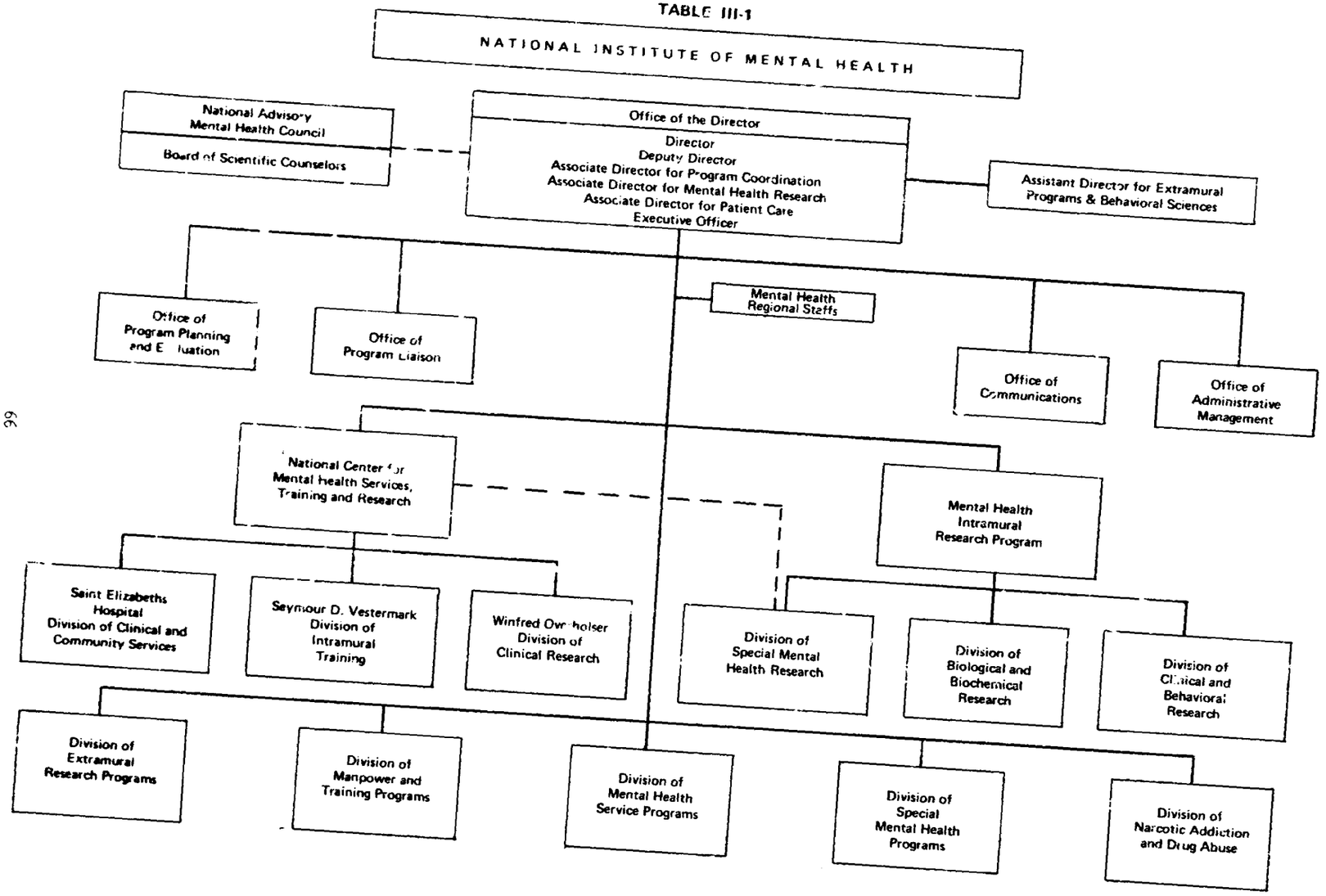
Originally the National Institute of Mental Health was one of nine components of the National Institutes of Health of the U.S. Public Health Service. In 1967 the National Institute of Mental Health became one of the five operating bureaus of the Public Health Service and subsequently one of the components of the Health Services Mental Health Administration. The present staff of the NIMH exceeds 2,500 and the agency has a budget of approximately $400 million. In addition to the central offices in Chevy Chase, the Institute operates Clinical Research Centers in Lexington, Kentucky and Fort Worth, Texas, a demonstration mental health study center in Prince George's County, Maryland and the National Center for Mental Health Services Training and Research, formerly St. Elizabeth's Hospital.

An organization chart of the National Institute of Mental Health is presented in Table III-1.

The Office of Communications was established on January 1, 1967, as one of four new units in the reorganized National Institute of Mental

Preceding page blank

TABLE III-1


NATIONAL INSTITUTE OF MENTAL HEALTH
National Advisory Mental Health Council
Board of Scientific Counselors
Office of the Director
Director
Deputy Director
Associate Director for Program Coordination
Associate Director for Mental Health Research
Associate Director for Patient Care
Executive Officer
Assistant Director for Extramural Programs & Behavioral Sciences
Office of Program Planning and Evaluation
Office of Program Liaison
Mental Health Regional Staffs
Office of Communications
Office of Administrative Management
National Center for Mental Health Services, Training and Research
Mental Health Intramural Research Program
Saint Elizabeths Hospital Division of Clinical and Community Services
Seymour D. Vestermark Division of Intramural Training
Winfred Overholser Division of Clinical Research
Division of Special Mental Health Research
Division of Biological and Biochemical Research
Division of Clinical and Behavioral Research
Division of Extramural Research Programs
Division of Manpower and Training Programs
Division of Mental Health Service Programs
Division of Special Mental Health Programs
Division of Narcotic Addiction and Drug Abuse

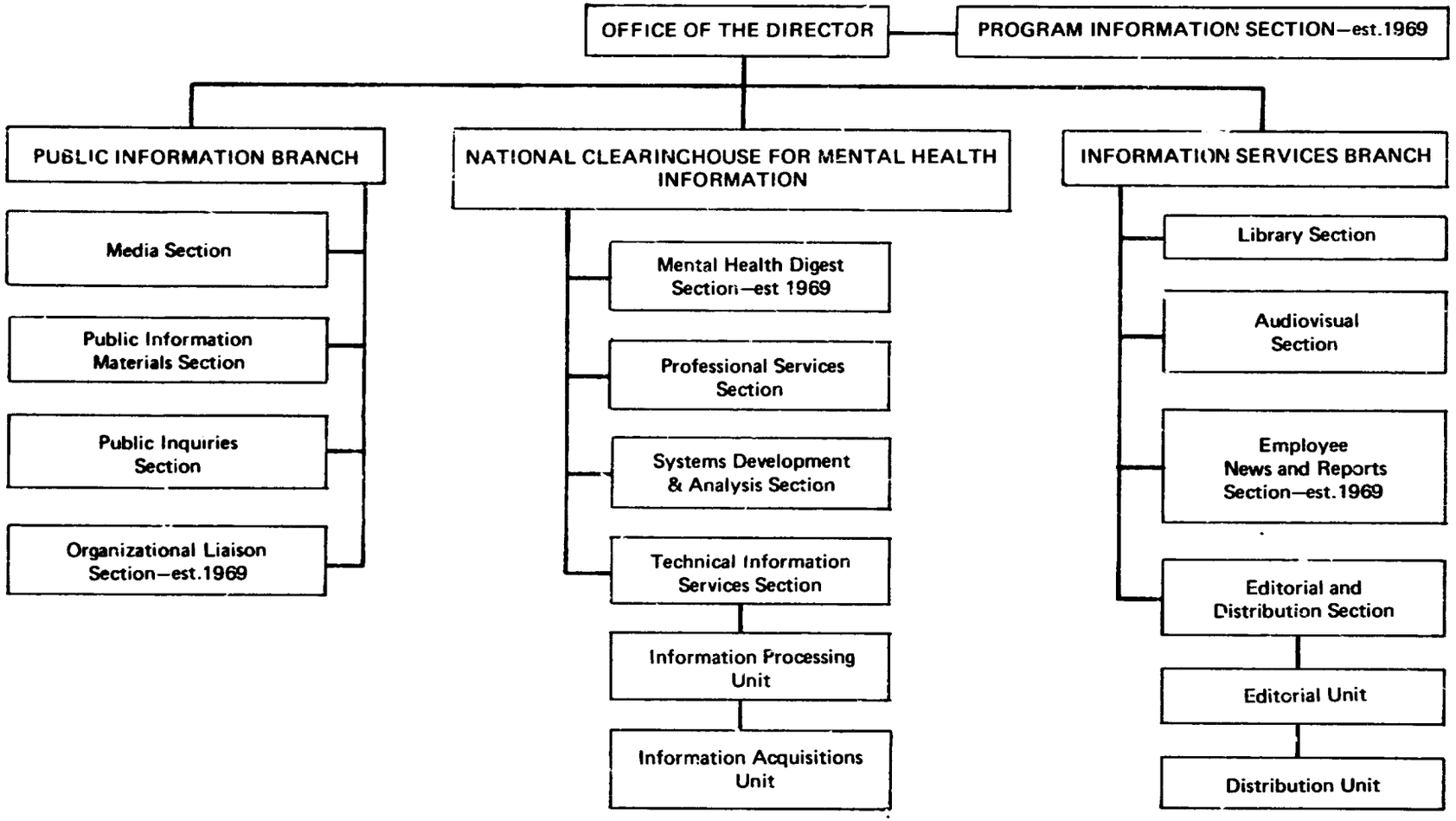
Health. The Office was created to serve as a focal point for all of the Bureau's information and scientific communications activities. It incorporated the existing Public Information Office and the existing National Clearinghouse for Mental Health Information. A third unit was added, the Information Services Branch, which at that time included the NIMH LIbrary. Conceived as a total information resource, the Office of Communications has been responsible for planning and producing the wide range of information services and products required by the National Institute of Mental Health in discharging its responsibilities.

The Public Information Branch, formerly the Public Information Office, is responsible for the public information activities of NIMH. The branch responds to press inquiries and services feature writers, television writers and radio broadcasters. It prepares news releases, assists national magazines in the preparation of feature stories. produces documentary films and cooperates in the production of documentaries by private organizations. Among its major responsibilities is the answering of public inquiries which currently exceed 20,000 a year. The branch also distributes NIMH publications and prepares a weekly report on research and program development.

The Information Services Branch is relevant to this report because when the Office of Communications was established it incorporated the Library. The Library is discussed in detail below. The Information Services Branch also provided editorial services, art, graphic, photographic, and other audio-visual services, distribution services, and clearance processing. Both the audio-visual section and the editorial and distribution sections maintained substantial and varied programs. Due to difficulties in management control over a growing range of problems the Information Services Branch was reorganized in late 1968 into two Branches; the Publications Management Branch and the Audio Visual and Telecommunications Branch. The Library was transferred at this time to the Office of the Director, Office of Communications. The National Clearinghouse for Mental Health Information, the third branch of the Office of Communications, was created in 1962. Its primary functions are acquisition of information about mental health and the processing of this information by cataloging, abstracting, indexing and coding. It stores and retrieves this information as needed in NIMH programs. The Clearinghouse is a computer-based operation and uses the services of contractors to a substantial extent. The major users of the information collected and stored by the NCMIH include research scientists in disciplines relevant to mental health, practitioners in mental health fields, administrators of mental health programs and lay citizens active in voluntary mental health groups.

The Current organization chart of the Office of Communications in 1969 is shown in Table III-2. However, since its issuance two substantial changes have been made in the Office. The Library has been moved from the Information Services Branch to the Office of the Director. The change was made to give the Library greater status and to facilitate its further development. Second, six assistant directors of the Office have been appointed for program liaison with each of the operating divisions of the Institute.

TABLE III-2. OFFICE OF COMMUNICATIONS



The Office of Communications is headed by an information specialist of long experience in both government and industry. Prior to appointment as Director of the Office of Communications, he was Director of Information for the National Library of Medicine. The staff of the Office of Communications includes approximately 90 persons of whom some 20 are part-time. The 30 professionals include editorial specialists, specialists in audiovisual work, specialists in photography and television and librarians, psychiatrists, psychologists and information technicians.

The National Clearinghouse for Mental Health Information

The National Clearinghouse for Mental Health Information was established in 1962 to assist the National Institute of Mental Health in carrying out its general mission of improving the mental health of the people in the United States. To succeed in this mission it was obvious that the Institute had to gather, process, and communicate information on all phases of mental illness and health from basic research to the application of knowledge. This information had to be comprehensive, timely and precise and it had to be prepared for both individual scientists, practitioners, professional organizations and the general public. The information problem of the National Institute of Mental Health and the mental health profession is indicated by a few figures. Approximately 160,000 articles, books and other scientific publications on mental health are issued each year. Further, some 4,000 journals regularly contain some mental health information. This literature is intradisciplinary, extending from basic bio-chemistry and psycho-pharmacology through the range of the behavioral sciences. There is also a time lag between research and the published results of research which creates a further problem in gathering current mental health information.

In an effort to cope with the volume of mental health literature, the Institute established the National Clearinghouse for Mental Health Information as its central resource for the collection, processing and dissemination of scientific information. The Clearinghouse was designed to be a major national scientific information resource. That is, a central resource from which anyone working in the field of mental health could obtain information. The Clearinghouse has three general objectives:

1. To establish and maintain a central computer-based resource for the systematic collection, processing, storage, retrieval and dissemination of mental health information;

2. To provide information to individuals and to groups in response to inquiries and on a regular distribution basis;

3. To compile, synthesize and assess mental health information in order that it may be most effectively used in the achievement of the mission of the Institute.

The Clearinghouse is composed of three sections: (1) Technical Information Section, (2) Professional Services Section, and (3) Program Development and Analysis Section.

The Technical Information Section is responsible for acquisitions and processing. The acquisitions program includes gaining possession of as many as possible of the 160,000 articles, books, monographs, reports and unpublished materials issued annually in the field. More than 4,000 journals are scanned which include some 400 in foreign languages. Three thousand of the journals are scanned through an arrangement with the National Library of Medicine with the use of a MEDLARS print-out. The documents selected for the storage and retrieval system are abstracted and indexed. By June 30, 1969, approximately 180,000 documents had been selected and abstracted for inclusion in the system. This unit also is responsible for information retrieval and the answering of specific requests. It also issues certain publications on a regular and special basis. It is to be noted that the indexing and abstracting services are provided principally by contract.

The publications program is to be noted particularly. It includes nine periodicals:

1. *Bulletin of Suicidology*
2. *Crime and Delinquency Abstracts*
3. *Drug Dependence*
4. *Mental Health Digest*
5. *Mental Retardation Abstracts*
6. *Occupational Mental Health Notes*
7. *Psycho-Pharmacology Abstracts*
8. *Psycho-Pharmacology Bulletin*
9. *Schizophrenia Bulletin*

In addition, specialized publications are issued periodically including, particularly, bibliographies.

The Professional Services Section is responsible for analyzing current mental health scientific information. Literature reviews and state-of-the-art papers are produced in this unit which also makes arrangements for the writing of materials on mental health. The professional staff also presents speeches and papers at professional and scientific meetings.

The Program Development and Analysis Section plans, designs and develops information systems for the Clearinghouse. It is the liaison unit of the Clearinghouse on the development and maintenance of its computer-based systems and also conducts studies of mission effectiveness and evaluates specific programs and media.

The Clearinghouse is directed by two psychiatrists, the Chief being a man who has had substantial experience in the publications field. The staff includes 22 positions, which are shown in Table III-3.

The funds which have been available for the operation of the Clearinghouse from 1963 to 1969 are as follows:

Year	Amount	Year	Amount
1963	$ 370,000	1967	$1,194,000
1964	523,000	1968	830,000
1965	742,000	1969	880,000
1966	1,098,000		

The Library of the National Institute of Mental Health

As noted above, the Library was moved this year from the Information Services Branch to the Office of the Director of the Office of Communications. The Director of the Office of Communications is the Acting Chief of the Library.

The staff of the Library includes two librarians (GS-11 and GS-9) and one clerk. The holdings are approximately 4,000 books and documents plus the major journals in the field.

The Library was termed conventional by the chief librarian who stated that its principal function was reference work for Institute staff members. Inquiries, it was stated, average about 40 per week. The Library also conducts a large inter-library loan program. The Library does not issue bibliographies as the Clearinghouse has responsibility for this function.

In discussing the relations of the Library with the Clearinghouse, the senior librarian made the following principal points: First, since the Clearinghouse has existed since 1962 and the Library was established in 1965, there has been no consideration of putting the Clearinghouse in the Library.

Second, that the Library obviously could not perform the functions of the Clearinghouse with its present staff.

Third, she doubted that the profession would accept the products of the Clearinghouse if they were produced by the Library.

Fourth, she did not feel that the Library and the Clearinghouse were in competititon. The Library uses the Clearinghouse products and helps to disseminate them.

Fifth, there is adequate communication between the Clearinghouse and the Library and collaboration on problems of mutual interest.

Sixth, unquestionably the Clearinghouse does carry on certain functions--including the production of bibliographies, abstracting, and specialized services--that would be partially carried on by the Library if the Clearinghouse did not exist.

In summary, the senior librarian stated that she was generally satisfied by the organization of the Office of Communications with the present division of information responsibilities between the Library and the Clearinghouse. She emphasized that the Library was associated in

TABLE III-3
POSITIONS IN THE NATIONAL CLEARINGHOUSE FOR MENTAL HEALTH INFORMATION
September 1969

TITLE	TRAINING	DEGREE	GRADE
Social Science Analyst	Experimental Psychology English, Education Tech.	A.B.	GS-12
Scientific Director	Psychology	Ph.D.	GS-15
Technical Information Specialist	Psychology	A.B.	GS-9
Publications (Supervisory Editor)	English–Communications	M.A.	GS-13
Acting Head, IPU	Education	B.S.	GS-12
Technical Information Specialist	Military Science–Languages	M.A.	GS-11
Technical Information Specialist	Business Administration (Grad. from Polish Business School degree equal to B.A.)	B.A.	GS-11
Editor-Writer	Chemistry	B.S.	GS-12
Acting Chief, PSS	Social Work	M.A.	GS-13
Technical Information Specialist	Education	M.S.	GS-11
Technical Research Specialist	Medical Sciences	A.B.	GS-12
Assistant Chief, NCMHI	Medicine–Psychiatry	M.D.	Sr. Surg. PHS
Assistant to the Chief, TIS	Medicine–Psychiatry	M.D.	Surg. PHS
Research Assistant	Psychology	A.B.	A.H.S.O. PHS
Chief, TIS	Pre-Med.–Chem., Bio., French	B.S.	GS-14
Editor-Writer	Journalism, Psychology	A.B.	GS-7
Technical Information Specialist	Sociology–Education	A.B.	GS-7
Acting Head, IAU	Sociology, Mental Retardation	M.A.	GS-12
Technical Information Specialist			GS-7
Technical Information Specialist	English	3 yrs. College	GS-9
Chief, NCMHI	Medicine–Psychiatry	M.D.	Med. Dir. PHS
Program Analyst	Psychology	A.B.	A.H.S.O. PHS

the Office of Communications with the other elements of the total information process with which it had good relations. In its present position the Library, she continued, was receiving full understanding of its problems and strong administrative support.

The question of the relations of the Clearinghouse with the Library was discussed specifically with the Chief of the Clearinghouse, Dr. David Swenson. He agreed that the Clearinghouse was engaged to a considerable extent in what were once considered exclusively library functions of acquisition, abstracting, indexing, and the publication of bibliographies. However, he stated that there were certain factors that indicated the independent organization of the Clearinghouse. First, the great volume of material to be covered. Second, the speed with which coverage had to be achieved and information made available. Third, the necessity of professional supervision of abstracting and publication. This process, to Dr. Swenson, is the principal reason for the existence of the Clearinghouse, its essential process. He added that he did not believe the profession would accept the products of the Clearinghouse if it were not an independent organization directed by medical doctors. Fourth, the large scale publication program. Dr. Swenson did not believe that the Library could perform these functions because it did not have and could not attract an adequate staff of psychiatrists and psychologists and did not have the capacity to operate a computer-based storage and retrieval system.

Subsequent to the interviews on which this report is based, the Office of Communications created a task force to consider the feasibility of placing the Library in the Clearinghouse on the assumption that such a reorganization would strengthen both units.

Summary

The National Clearinghouse for Mental Health Information represents the effort of the National Institute of Mental Health to cope with the "information explosion" of scientific and technical writings. The Institute believed that the acquisition and swift utilization of technical information required the creation of a special organization directed and staffed by professionally and technically trained personnel whose responsibilities included the analysis and evaluation of information as well as collection, indexing and storage. Such an organization would have to rely heavily on electronic storage and retrieval technology. However, in NIMH the collection, analysis and publication of technical information has been considered part of a total information process, and thus associated in the same organization with the Library and with public information activities. Thus, like certain other Federal agencies, NIMH believes in the concept of a total information organization.

IV. THE PESTICIDES INFORMATION CENTER NATIONAL AGRICULTURAL LIBRARY U.S. DEPARTMENT OF AGRICULTURE

The National Agricultural Library is one of the world's great libraries. It is the second largest Federal Library and contains the most comprehensive collection in the world of agricultural, biological, and general chemical publications. The Library is as old as the U.S. Department of Agriculture. The Organic Act of 1862 establishing the Department included the famous statement of mission, "to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word." The Act also gave the Secretary of Agriculture the responsibility to "acquire and preserve all information concerning agriculture which he can obtain by means of books. . ." The Department established a Library in 1862 which in 1962 was designated the National Agricultural Library by Act of Congress.

The National Agricultural Library makes available to the research workers of the Department, agricultural colleges and universities, other government agencies, agricultural associations, industry, individual scientists, farmers and the general public the agricultural knowledge of the world contained in literature. The Library collects all published material on agriculture and organizes it for use through reference services, loans of publications, photo reproduction, and bibliographical services. A monthly *Bibliography of Agriculture* is issued in which is listed the agricultural literature of the world. The Library also publishes a biweekly *Pesticides Documentation Bulletin* and provides catalog information to a commercial publisher for inclusion in the monthly *National Agriculture Library Catalog*, a listing of currently acquired titles.

The present collection of the National Agricultural Library contains approximately 1,300,000 volumes including publications in 50 languages. The present authorized staff of the Library is approximately 200 and its appropriation for fiscal 1969 was approximately $3,500,000. The Library has a tradition of strong leadership and high quality service. In 1968/69, 228,314 publications were loaned and 104,915 reference questions answered. The Library recently occupied a new building built for it at the Agricultural Research Center, Beltsville, Maryland.

The National Agricultural Library presently is directed by Mr. John Sherrod, who reports to the Department's Science and Education Director. The Director of the Library is responsible for coordinating all science information services within the Department of Agriculture and establishes policies for the planning, control, performance, and improvement of functions dealing with the processing, handling, and communication of scientific and technical information. Staff support for this responsibility is provided by the Office of the Assistant Director, Program Coordination Services. The National Agricultural Library cooperates closely with the other national libraries--the Library of Congress and the National Library of Medicine--and has joined them in a National Libraries Task Force on Automation and other cooperative services. The

Preceding page blank

goals of the three libraries include the development of a national data-bank of machine-readable catalog information and the establishment of a national data-bank of information on serial publications. Tables IV-1 and IV-2 show organization charts of the U.S. Department of Agriculture and the National Agricultural Library.

The Pesticides Information Center

The Pesticides Information Center was established in the Library in 1965 after Congress assigned responsibility for research on pesticides to the Department of Agriculture. This mission substantially expanded the research programs of the Department and required a means of collecting the world's literature on pesticides.

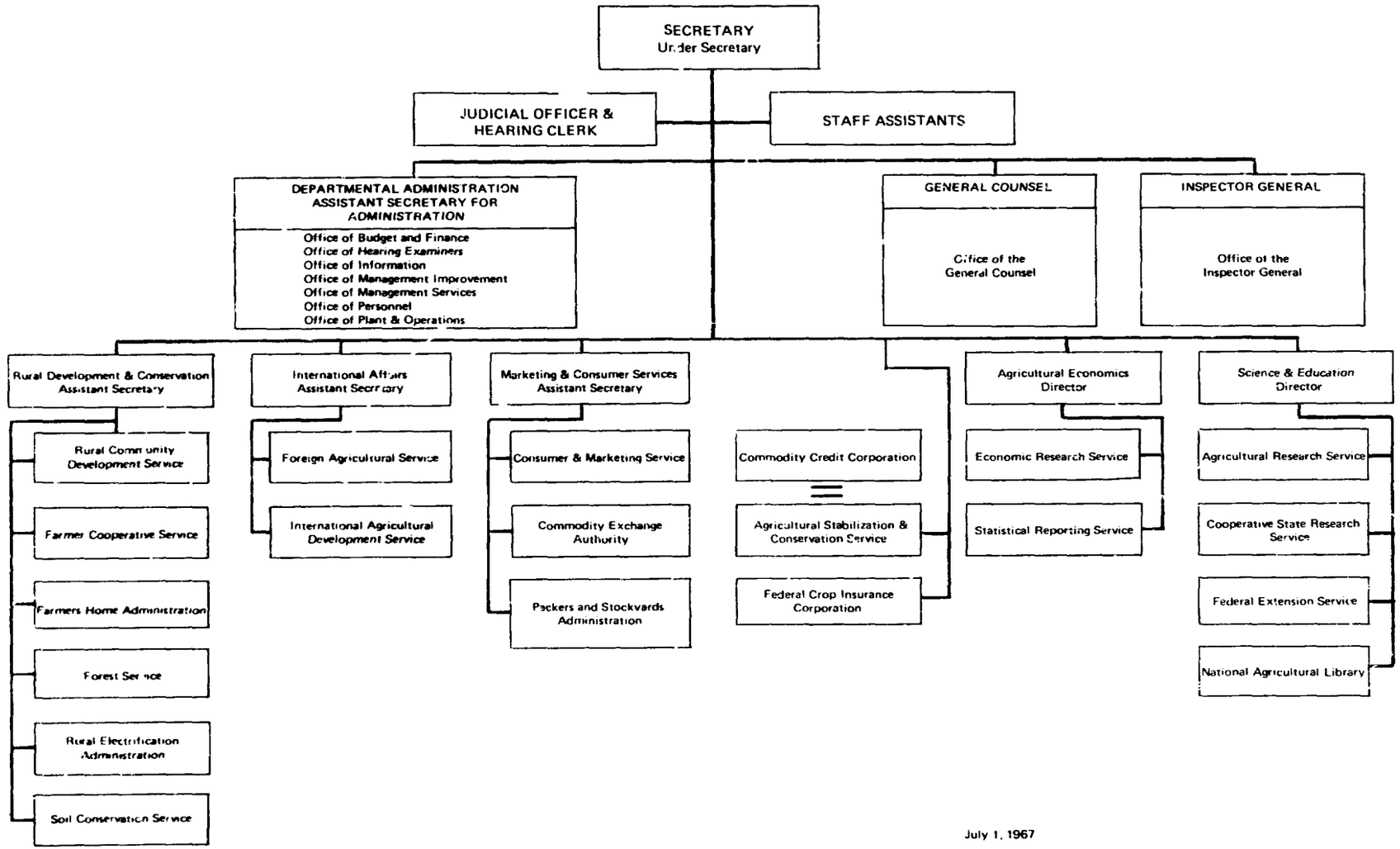
The Library took the initiative in establishing the Pesticides Information Center which was designed to serve as a government-wide information center on pesticides. As such, it indexes, stores, retrieves and disseminates citations to the published and unpublished literature on pesticides and related subjects. It also evaluates this literature to a certain extent. The subject coverage includes all of the research areas identified by agencies of the U.S. Department of Agriculture as being directly or indirectly related to the control of pests and diseases of plants and animals. These include research on control of plant pests and diseases and animal parasites, basic research on the biology and ecology of insects, research on conventional pesticides, research on the toxicological and pathological effects of pesticides and economic research on comparative farm costs of controlling insects.

The products of the Pesticides Information Center are several. The primary publication is the *Pesticides Documentation Bulletin*, a bi-weekly index to literature covered. This journal has been issued since 1965 and has been indexing at the rate of about 35,000 documents per year. The Bulletin is produced by a computer-based system operated by a contractor, the Washington Data Processing Center. The National Agricultural Library acquisitions provide the bulk of in-puts into the system. The principal auxiliary sources of information relating to pesticides include the Departments of Interior, Health, Education, and Welfare, and the Department of Defense.

The other products of the Pesticides Information Center include special bibliographies and demand searches. The Center expects to produce in the near future state-of-the-art reports and to develop a program of disseminating information selected on the basis of user interests. The users of the products of the Pesticides Information Center include all government agencies and industrial organizations concerned with pest controls.

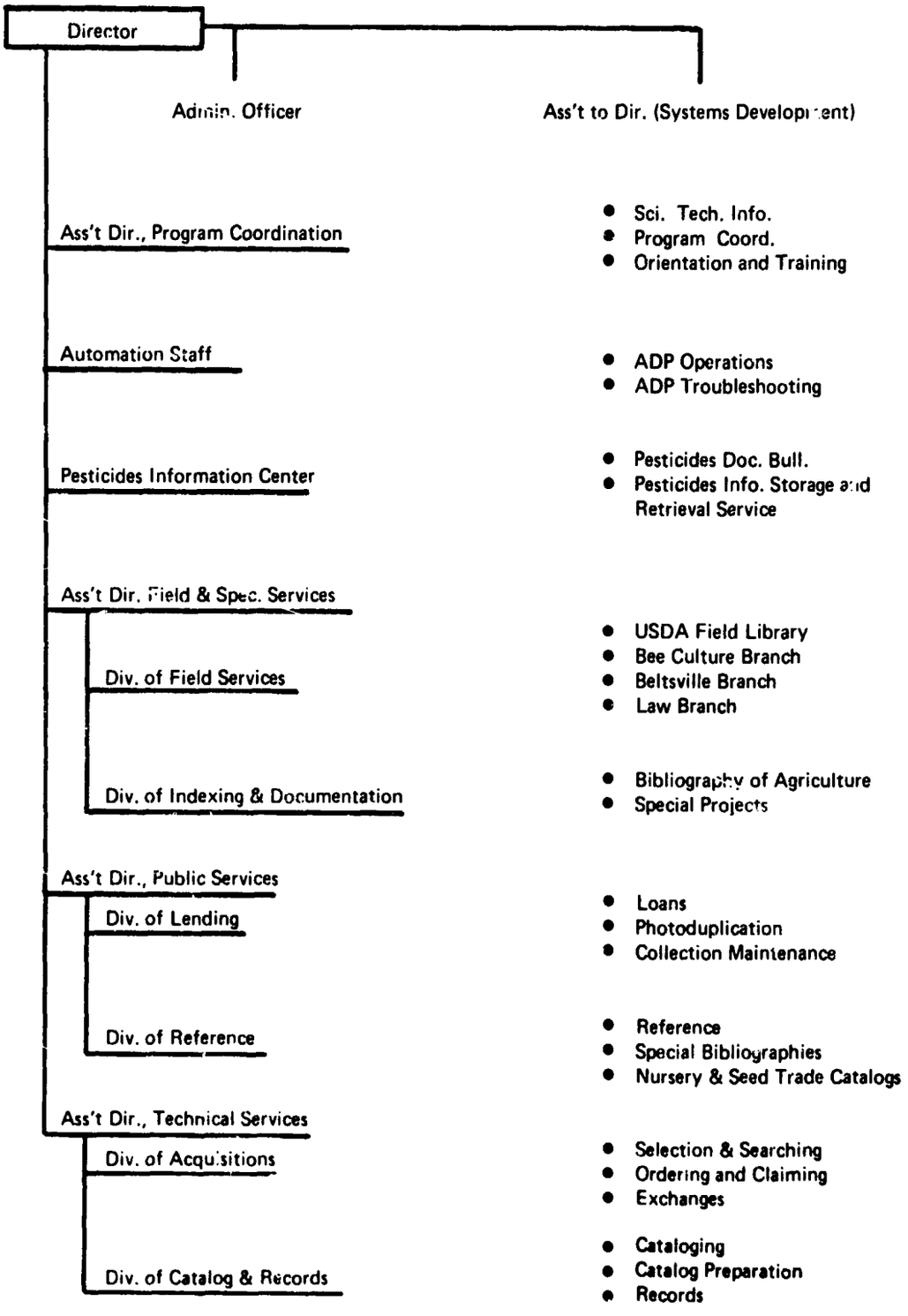
It is to be noted that the present Head of the Pesticides Information Center, Mr. Charles N. Beebe, is particularly concerned with increasing the evaluation of pesticides literature by the Center. The present evaluation activity includes: First, selection of materials from the total materials used for the *Bibliography of Agriculture*.

TABLE IV-1. UNITED STATES DEPARTMENT OF AGRICULTURE



July 1, 1967

TABLE IV-2. FUNCTIONAL ORGANIZATION OF NAL



Second, review of the material by professional editors for significance and correctness of indexing. Third, editing of the master files after publication. Mr. Beebe emphasized that he hoped to increase the production of special services, selected bibliographies, and state-of-the-art reviews.

The Head of the Pesticides Information Center reports to the Assistant Director of the Library for Systems Development. The staff of the Center includes ten positions, five of which are professional. Both the Head of the Center and the Assistant Head (at Grades 13 and 12, respectively) are trained librarians. The Head of the Center, however, has had some ten years of experience in computer-based information programs. The other professional members are a Technical Information Specialist, Grade 11, trained in biology; and a Technical Information Specialist, Grade 11, trained as a chemist. The staff does not include a systems analyst or programmer as such assistance is obtained from the Center's contractor.

The first appropriation for the Center, in 1965, was $250,000. The appropriation for the Center for the fiscal years 1966 through 1970 has remained constant at $295,000, which includes the contract costs.

Relations of the Pesticides Information Center with the National Agricultural Library

The particular significance of the Pesticides Information Center in this study is its establishment within a Library. Most information centers, as is well-known, are independent of the libraries of their agencies. The reasons for the establishment of the Pesticides Information Center in the National Agricultural Library seem obvious. The primary reason is the size and quality of the Library as described above. Further, the Library's leadership has readily utilized the technological developments in the field in the last 20 years and was quick to take the initiative in establishing the Center when the need for it became obvious.

The Director of the Library believes the Pesticides Information Center should be in the Library because its primary concern is getting information from its resources. He does not believe that its present functions include significant qualitative evaluations but rather that it is an organization for the selection, abstracting and indexing of literature which is largely in the National Agricultural Library. However, if the Pesticides Information Center were heavily engaged in information analysis, the Director of the Library believes that it should be located as closely as possible to the scientists who use its products, presumably in the Agricultural Research Service.

Although the Director of the Library believes that the Pesticides Information Center should be in his jurisdiction because the bulk of the literature it uses is there, he does not regard its presence as an unmixed blessing. The Center, he stated, represents an overemphasis on one particular field and thus has unbalanced the Library's program. The Center also has increased the workload of other units in the Library,

especially Acquisitions. It also has made more difficult the work of the Reference unit as it "ties up" many of the Library's holdings for considerable periods. Further, the Director stated, the Pesticides Information Center has not been adequately financed and accordingly has been a drain on the Library's general resources.

In summary, the Director of the National Agricultural Library believes that the future organizational position of the Pesticides Information Center will depend upon the extent to which its evaluation activities are increased. If the Center does substantially increase its evaluation work, then he believes it should be located closer to the scientists who use its products.

The mixed feeling of the Director of the National Agricultural Library about responsibility for the Pesticides Information Center is shared by the Head of the Center, Mr. Beebe. While Mr. Beebe agrees that the Library's collections do provide the bulk of the in-put into his system, he questions the location of the Center in the Library. To him the Center would be considered an out-put unit serving the needs of pesticides research in the Department of Agriculture and elsewhere. Thus he believes that the Center would be more effective if it were located within the Agricultural Research Service. Such a location would make the Center an integral part of the general research program on pesticides and, he believes, give the Center stronger financial support.

The Head of the Center also considers that in its present location it is an adjunct of the Library and not an integral part of the parent organization. Further, although the Center receives specific appropriations, its Head does not believe that it is adequately supported by the Library. Third, Mr. Beebe stated that although the Center had increased requests to the Library for service through its publications, the Library had not been able to meet these requests fully.

Summary

The establishment of the Pesticides Information Center in the National Agricultural Library indicates that such an organization can be created and successfully operated by a library when certain conditions are present. These include, from the experience of the Department of Agriculture, an adequate basic collection, aggressive and comptetent leadership, and willingness to experiment with new forms of organization and new technology. The comments, however, of both the Director of the National Agricultural Library and the Head of the Pesticides Information Center indicate a real question as to whether such a specialized information organization should be located in a library. In the case of the Pesticides Information Center the criterion apparently is the extent of evaluation of literature. So long as the Center is engaged primarily in the collection of information, apparently it will remain in the Library. If, however, the Center does realize its objective of increasing evaluation of materials, then it seems quite possible that it would be transferred, by mutual agreement, to an organization position of other subjects of this study, especially the Plastics Technical Evaluation Center of Picatinny Arsenal.

The comments recorded above of the Director of the National Agricultural Library and the Head of the Pesticides Information Center also indicate substantial differences in the objectives and activities of the two organizations which have caused considerable tension in their relationship.

V. REDSTONE SCIENTIFIC INFORMATION CENTER
U.S. ARMY MISSILE COMMAND
REDSTONE ARSENAL

The headquarters of the U.S. Army Missile Command is located at the Redstone Arsenal, Huntsville, Alabama. The Arsenal also is the site of the Marshall Space Flight Center. One of the principal components of the U.S. Army Missile Command is the Research and Engineering Directorate which includes the Redstone Scientific Information Center, the subject of this study. The organization chart of the Research and Engineering Directorate is shown in Table V-1.

The mission of the Redstone Scientific Information Center is to supply scientific and technical information support to the U.S. Army Missile Command, the Marshall Space Flight Center and to their contractors. A short review of the history of the Redstone Scientific Information Center follows to indicate the development of its present organization and programs.

In December 1948, Redstone Arsenal was designated a Center for Ordnance Department research and development activity pertaining to rockets and related items. A Technical Library was established at the Arsenal in March 1949 to support this research and development mission. The mission of the Technical Library was twofold: First, to keep abreast of all scientific and technological research and development outside the Ordnance Department pertaining to the development of rockets. This function incuded maintaining liaison with educational and scientific institutions, industrial establishments and other government agencies with interests in this field. Second, to serve as the principal source of technical information within the Ordnance Department on this material. The Library immediately received thousands of technical reports in its fields of interest from other organizations within the Ordnance Department. In April 1949, the Thiokol Corporation relocated its plant and laboratory from Elkton, Maryland, to the Redstone Arsenal. Thiokol's Research and Development Library was transferred in this process and incorporated in the Technical Library which substantially expanded its resources.

In November of 1949 the Commanding Officer of Redstone Arsenal issued a policy that library services would be available to contractors as well as to Army personnel. The principal services rendered at that time were the collection of research and development reports published by government agencies and contractors, the collection of bound books and journals and the maintenance of current journal issues. The two principal contractors at Redstone at that time, Thiokol and Rohm and Haas, both provided an employee to work in the Library.

In 1950 the Library was expanded again in accordance with the transfer to Redstone Arsenal of the Ordnance Research and Development Sub-Office from Fort Bliss, Texas. The transfer included a collection of technical books and reports which subsequently was incorporated in the Technical Library. In 1951 the captured Peenemunde documents were transferred to the Technical Library from Aberdeen Proving Ground along

Preceding page blank

TABLE V-1. RESEARCH AND ENGINEERING DIRECTORATE
DIRECTORY CHART

August 1988

AMSMI-R — **4505**

OFFICE OF THE DIRECTOR

Director	Col R.M. Bingaman	6-3131
Technical Director	Dr J.L. McDaniel	6-1488
Sci & Eng Advisor	Mr J.T. Fagan	6-4481
Chief Engineer	Mr G.S. Murdough	6-7612
Executive Officer	Maj A.A. Bonsall	6-1718
Spec Asst to Tech Dir	Mr K.L. Ashlock	6-3885
Spec Asst to Tech Dir	Mr T.C. Brandon	6-2664
Liaison Office - WSMR	Mr H.C. Snell	

MI-RP — **4505**

PROGRAMS COORDINATION OFFICE

CHIEF, Mr J.F. Rush	AMSMI-RP	6-3934
PROGRAMS BR	-RPM	
CHIEF, Mr E.R. Ford		6-3516
MANAGEMENT ENGINEERING BR	-RPM	
CHIEF, Mr C.B. Colburn		6-8319
LOGISTICS AND ADMINISTRATIVE BR	-RPA	
CHIEF, Mr H.G. Black		6-6612
REVIEW & ANALYSIS BR	-RPR	
CHIEF, Mr H.L. Hall		6-4522

MI-RP — **4484**

REDSTONE SCIENTIFIC INFORMATION CENTER

DIRECTOR, Dr J.L. McDaniel	AMSMI-RB	6-4643
LIBRARY BR	-RBL	
CHIEF, Mrs C. Cason		6-7007
INFORMATION RESEARCH BR	-RBP	
CHIEF, Mrs C. Cason		6-1372

MI-RN — **4505**

ADVANCED RESEARCH PROJECTS DIVISION

CHIEF, Dr R.G. Rhoades	AMSMI-RN	6-4016
DEPUTY CHIEF, R.L. Pugh		6-3700
PROGRAM COORD & ADMIN OFC	-RNP	
Mr W.E. Cobb		6-2800
OVERSEAS RESEARCH GROUP	-RNR	
Mr J. Hagenbuch		6-2641
STRATEGIC TECHNOLOGY GROUP	-RNS	
Mr J.C. Spencer		6-6887
ADVANCED SENSORS GROUP	-RNO	
Mr J. Shelton		6-4852

MI-RF — **4505**

FUTURE MISSILE SYSTEMS DIVISION

CHIEF, Col E.M. Rothschoner	AMSMI-RF	6-2607
DEPUTY CHIEF, Mr H.F. Vincent		6-2340
PROG COORD & ADM OFC	-RFA	
CHIEF, Mrs V.P. Eddy		6-1017
TECHNOLOGY PLANNING OFFICE	-RFE	
CHIEF, Mr E.B. Dahlbom		6-1050
ADV DEV PROJECTS OFFICE		
AFAADS--CHIEF, Mr D.E. Pickens	-RFD	6-1718
MISTIC--CHIEF, Mr N.L. Bak	-RFG	6-1583
SYSTEMS ANALYSIS OFFICE	-RFO	
CHIEF, Mr C.W. Hussey		6-1700

MI-RD — **5400**

ADVANCED SYSTEMS LABORATORY

DIRECTOR, Mr H.A. Dunn, Jr	AMSMI-RD	6-1113
TECH ASST - ISMIS, Mr R.W. Fraught		6-4141
TECH ASST - BATS, Mr W.B. Wilson, Jr		6-4141
PROG, COORD & ADMIN OFFICE	-RDC	
CHIEF, Mr R.J. Colburn		6-3688
RESEARCH & TECHNOLOGY OFC	-RDT	
CHIEF, Mr W.M. Mahoney		6-4141
ADVANCED CONCEPTS BR	-RDE	
CHIEF, Mr D.A. Mandel		6-7462
AERODYNAMICS BR	-RDK	
CHIEF, Mr R.A. Crisp		6-6841
CONCEPTS DESIGN BR	-RDP	
CHIEF, Mr R.W. Lee		6-2103
SYSTEMS DYNAMICS BR	-RDD	
CHIEF, Mr R.D. Pearce		6-6856
SYSTEMS EVALUATION BR	-RDF	
CHIEF, Mr R.G. Fortune		6-4846
ACTION GROUP II	AMSMI-RDA	
DIRECTOR, Dr W.C. McCorkle, Jr		6-6443

MI-RR — **5429**

PHYSICAL SCIENCES LABORATORY

DIRECTOR, Dr J.P. Hallowes, Jr	AMSMI-RR	6-3860
DEPUTY DIR, Mr N.M. Shapiro		6-4758
NUCLEAR PROG MGR, Mr L.L. Lively		6-2768
LASER PROG MGR, Mr W.B. Jennings, Jr		6-2768
PROG COORD & ADM OFC	-RRY	
CHIEF, Mr R.V. Kruse		6-3780
TECHNICAL SUPPORT BRANCH	-RRT	
CHIEF, Mr H.E. Hay		6-6801
AERONAUTICS BRANCH	-RRX	
CHIEF, Mr A.H. Jackson		6-4608
PLASMA PHYSICS BRANCH	-RRP	
CHIEF, Dr T.A. Berry, Jr		6-3358
SOLID STATE PHYSICS BRANCH	-RRO	
CHIEF, Mr R.A. Shoup		6-1146
RADIATION PHYSICS BRANCH	-RPR	
CHIEF, Dr T.G. Meier		6-1828
ASTROPHYSICS BRANCH	-RRA	
CHIEF, Dr G.M. Ippolito, Jr		6-6867
OPTICAL SPECTROSCOPY BRANCH	-RRC	
CHIEF, Dr J.A. Mercer		6-3860
SOLID MECHANICS BRANCH	-RRS	
CHIEF, Mr R.E. Eby		6-4358
APPLIED PHYSICS BRANCH	-RRL	
CHIEF, Dr W.B. McKnight		6-2825

MI-RK — **7130**

ARMY PROPULSION LABORATORY AND CENTER

DIRECTOR, Mr F.W. Jones	AMSMI-RK	6-3732
DEPUTY DIR, Mr J.C. Dias		6-6115
ARMY NXT PROP TECH & MGMT CTR	-RKI	
DIRECTOR, Mr E.H. Fellowes		6-4482
PROG COORD & ADM OFC	-RKX	
CHIEF, Mr R.L. Mason		6-6880
SOLID PROPELLANT CHEMISTRY BR	-RKC	
CHIEF, Mr N.C. White		6-2812
MOTOR PROCESSING BR	-RKD	
CHIEF, Mr R. Skinner		6-2638
PROPULSION MECHANICS BR	-RKP	
CHIEF, Mr T.H. Dixon		6-3304
MEASUREMENT BR	-RKM	
CHIEF, Mr W.L. Strickland		6-1738
ADVANCED PROP ENGR BR	-RKA	
CHIEF, Mr D.F. Hoburt		6-7804
MOTOR AND POWER BR	-RKF	
CHIEF, Mr J.M. Tate		6-2348
PROPULSION SYS ENGR BR	-RKK	
CHIEF, Mr R.H. Frick		6-3842
LIQUID PROP TECH BR	-RKL	
CHIEF, Dr W.W. Stinchcomb		6-3388

MI-RE — **5400**

ADVANCED SENSORS LABORATORY

DIRECTOR, Mr W.J. Lindberg	AMSMI-RE	6-4048
DEPUTY DIR, Mr W.J. Mangus		6-1717
RESEARCH & TECHNOLOGY OFC	-REX	
CHIEF, Mr W.H. Todd		6-3880
FREQUENCY MGR, Mr W. Lawson		6-1273
PROG COORD & ADM OFC	-REA	
CHIEF, Mr G. Kaszubiy		6-1319
ELECTRO-OPTICAL BR	-REO	
CHIEF, Mr D. Hunter		6-2390
RADAR BR	-RER	
CHIEF, Mr J.A. French		6-4848
SYSTEMS BR	-RES	
CHIEF, Mr J. Zarovsky		6-2716
ACTION GROUP II	AMSMI-RCG	
CHIEF, Mr W.E. Wood		6-6017

MI-RG — **5400**

ARMY INERTIAL GUIDANCE AND CONTROL LABORATORY AND CENTER

DIRECTOR, Mr J.B. Hoff	AMSMI-RG	6-1651
DEPUTY DIR, Mr J.P. Leonard		6-1651
RESEARCH & TECHNOLOGY OFFICE	-RGX	
SCIENTIFIC ASST, Mr R.T. Gauthier		6-1187
PHYSICAL SCIENTIST, Mr R.L. Edwards		6-1843
JOINT CENTER, Mr W.R. Eisert		6-3842
PROG COORD & ADM OFC	-RGA	
CHIEF, Mr W.D. Matlock		6-4731
GUIDANCE SYSTEMS BR	-RGG	
CHIEF, Mr B.J. Clifton		6-7734
CONTROL SYSTEMS BR	-RGC	
CHIEF, Mr W.A. Gotsch		6-3261
SYSTEMS ANALYSIS BR	-RGN	
CHIEF, Mr C.V. Grotke		6-3189
INERTIAL SYSTEMS BR	-RGL	
CHIEF, Mr W.R. Stripling		6-3270
INSTRUMENTATION BR	-RGI	
CHIEF, Mr R.W. Cobb		6-6884
ELECTRICAL SYSTEMS BR	-RGE	
CHIEF, Mr J.B. Wright		6-6887
PROTOTYPE BR	-RGP	
CHIEF, Mr C.E. Raley		6-6822

MI-RL — **5400**

GROUND SUPPORT EQUIPMENT LABORATORY

DIRECTOR, Mr W.C. Watson	AMSMI-RL	6-6632
DEPUTY DIR, Mr N.L. Cavins		6-6158
RESEARCH & TECHNOLOGY OFFICE	-RLX	
CHIEF, Mr W.W. Hawkins		6-3424
PROG COORD & ADM OFFICE	-RLS	
CHIEF, Mr W.E. Wheeler, Jr.		6-6196
PRELIMINARY DESIGN BRANCH	-RLP	
CHIEF, Mr A.A. Smith		6-8426
AIRCRAFT WEAPONIZATION DESIGN BR	-RLA	
CHIEF, Mr W.B. Newby, Jr		6-3563
LAUNCH SYSTEMS BRANCH	-RLG	
CHIEF, Mr L. Nozzone		6-4165
ELECTRICAL DESIGN BRANCH	-RLE	
CHIEF, Mr W.K. Patterson		6-3728
LAUNCH & HANDLING EQUIP DES BR	-RLH	
CHIEF, Mr E.C. Rocks		6-1883
REQUIREMENTS & ANALYSIS BR	-RLR	
CHIEF, Mr L. Wilhoyte		6-3891
CONTAINER & AUX EQUIP DES BR	-RLO	
CHIEF, Mr C.E. Lyons		6-3797
TEST & CHECKOUT EQUIP BR	-RLT	
CHIEF, Mr A.L. Hunt		6-7571

MI-RS — **5400**

STRUCTURES AND MECHANICS LABORATORY

DIRECTOR, Mr W.A. Lines	AMSMI-RS	6-1719
DEPUTY DIR, Mr R.H. Penny, Jr		6-1210
PROG COORD & ADM OFFICE	-RSP	
CHIEF, Mr W.M. Rodden		6-4881
DYNAMICS ANALYSIS BR	-RSD	
CHIEF, Mr C.F. Gossling		6-6382
MATERIALS ENGR & DEV BR	-RSM	
CHIEF, Dr E. Wasserman		6-1211
STRESS & THERMODYNAMICS BR	-RST	
CHIEF, Mr J. Gilmore		6-1448
MISSILE DESIGN BR	-RSS	
CHIEF, Mr R.H. Penny, Jr		6-6858
SPECIAL PROJECTS BR	-RSB	
CHIEF, Mr W.G. Thumm		6-3882
SMALL ROCKETS BR	-RSC	
CHIEF, Mr H.D. Griffith		6-1874

MI-RT — **8716**

TEST AND RELIABILITY EVALUATION LABORATORY

DIRECTOR, Mr W.F. Lloyd	AMSMI-RT	6-3562
DEPUTY DIR, Mr C.L. Northrop		6-3566
PROG COORD & ADM OFC	-RTC	
CHIEF, Mr J.D. Shelton		6-4882
RESEARCH & TECHNOLOGY OFFICE	-RTP	
CHIEF, Mr C.E. Roberts		6-3482
STATIC TEST BRANCH	-RTS	
CHIEF, Mr S.R. Moore		6-3148
FLIGHT & OPERATIONAL TEST BR	-RTF	
CHIEF, Mr F.C. Bunn		6-1407
RELIABILITY TEST BR	-RTR	
CHIEF, Mr J.M. Taylor		6-3746
TEST RESOURCES & ANALYSIS BR	-RTA	
CHIEF, Mr G.L. Stewart		6-2646
O-R ENGINEERING BR	-RTO	
CHIEF, Mr C.H. Howell, Jr		6-1975

with catalogs of abstracts of captured documents. A further expansion of the Library followed in January, 1952, when it was made the repository for all films on rockets and guided missiles of the Ordnance Department and also designated as the repository for research and development reports. In 1953, the first of four legal libraries was established which by 1960 included approximately 4,000 volumes.

As indicated above, by 1960 the Technical Library of the Arsenal was a substantial organization professionally staffed and with very considerable holdings which included a complete set of the reports prepared by the Summary Reports Group of the National Defense Research Committee. In addition, the Library received automatically all reports issued in its field of interest by the Department of Defense and its contractors as well as those of other government agencies. The journal collection included some 400 titles and the number of bound books was approximately 40,000. In addition, there were substantial holdings of microfilm, microcard bibliographies and slides.

The organization of the present Redstone Scientific Information Center was stimulated by the establishment of the Marshall Space Flight Center of NASA in Huntsville in 1960. The Center was organized around a nucleus of rocket experts who previously had worked for the Army Ballistic Missile Agency. Now a large organization, the Center employs about 6,000 men and women and also contracts for many projects with corporations and universities.

With the establishment of the Marshall Space Flight Center, it seemed desirable to establish a scientific information center to serve both it and the U.S. Army Missile Command. Thus the Redstone Scientific Information Center was created in 1962. The mission of the Information Center was to supply both the Missile Command and the Space Center with scientific information and library services including translations, bibliographic information searches, abstracts and information retrieval. The Information Center was specifically directed to strive for exhaustive holdings in disciplines which supported the Missile Command and Space Center missions and also to support the established educational programs of both organizations.

The Redstone Scientific Information Center was established by the Missile Command and has been administered by a Director who is an employee of the Missile Command. However, a joint Redstone Scientific Information Center Board was established with four members appointed by both the Missile Command and the Space Center and with the chairmanship alternating between members from the respective organizations. The Board was given the usual functions of reviewing plans and programs proposed by the Director of the Center. The Missile Command provided the personnel, equipment, supplies and space for the central information facility. The principal component of the new Redstone Scientific Information Center was the previous Technical Library of Redstone Arsenal.

The present mission of the Redstone Scientific Information Center is an extension of its responsibilities as established in 1962. The Information Center is the principal source of published and controlled

literature on basic research in the fields of interest of the Missile Command and the Marshall Space Flight Center. It is expected to provide a complete scientific information service including library service, scientific and technical literature research, translation service, bibliographic service, and reference service for the Missile Command and the Space Center and for their contractors. Third, the Information Center is responsible for planning, managing, and conducting research and development in scientific and technical information handling including projects related to ADP soft wares, systems and programs. Fourth, the Information Center maintains liaison with universities, research institutes, information centers, government agencies, and their contractors. Fifth, the information Center participates in an information interchange program which reaches the bibliographic resources of the entire country and other countries as well. Sixth, the Information Center manages the Army's activities in the Inter-Service Data exchange Program.

Table V-2 is an organization chart of the Redstone Information Center. The organization chart requires only brief comment. The Library Branch plans and supervises the acquisition, organization and utilization of classified and unclassified technical information. It directs and provides central library services and maintains liaison with other libraries and information centers.

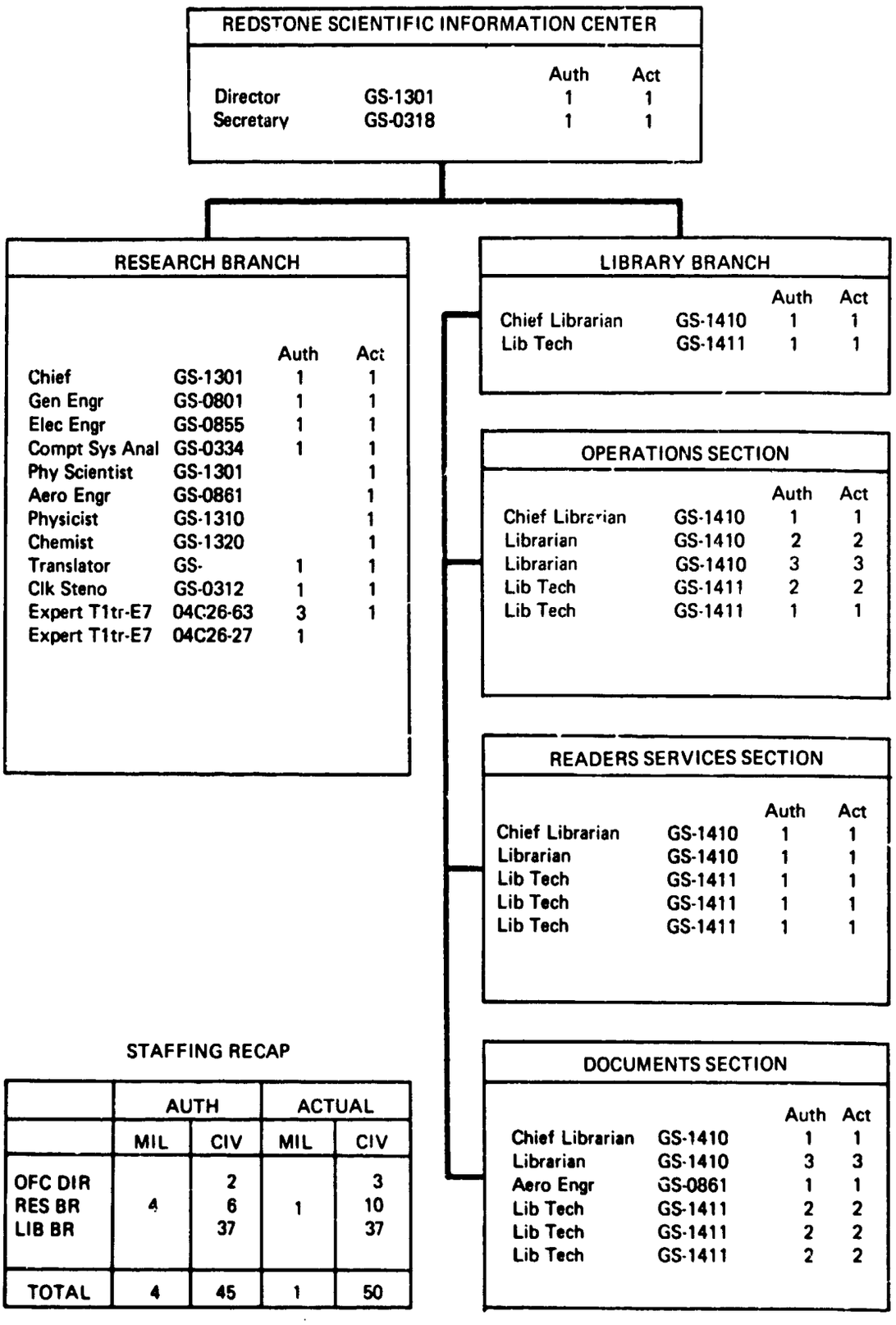
The Operations Section has developed an exhaustive open literature collection in the scientific and technical disciplines in which the Command and the Space Center have recognized missions. This collection includes foreign and domestic books, periodicals, pamphlets, and government publications.

The Reader Services Section provides reference and reader advisory services including the preparation of bibliographies, reading lists and summary memoranda. The Section also instructs all patrons, especially scientists and engineers, in the use of open literature bibliographic tools, verifies and locates specific papers and circulates books, pamphlets and other open literature as needed.

The Document Section selects and acquires unpublished and controlled technical information striving for exhaustive holdings in the areas for which the Missile Command and space Center have recognized missions. The Section also supplies reference and reader advisory services in the documented literature and circulates classified and controlled information. It searches NASA tapes using the Space Center computer and maintains Telex service through which DDC tapes are searched.

The Information Research Branch is of special significance in this study. This branch, staffed by approximately 12 professionals, plans, directs, or provides scientific and technical literature research programs and translation services. It manages and coordinates research development investigations; maintains liaison with other organizations performing scientific and technical information handling, manipulation, and exchange; maintains liaison with scientific and technical programs throughout the Arsenal; translates and reviews translations obtained by purchase contract.

TABLE V-2



STAFFING RECAP

	AUTH		ACTUAL	
	MIL	CIV	MIL	CIV
OFC DIR	4	2	1	3
RES BR		6		10
LIB BR		37		37
TOTAL	4	45	1	50

Auth: Authorized

December 10, 1969

The Information Research Branch does not have a computer based abstracting, indexing, and publishing operation. At one time, the Information Research Branch did make state-of-the-art surveys and special searches with its own staff. However, the work load was intermittent and could not justify the salaries of the professional specialists needed for this kind of in-house operation. Thus, in 1968, the Branch decided to execute such projects by contract for which the requesting unit of the Arsenal or the Space Center is charged. The Battelle Memorial Institute is the principal contractor. Contract operations in the last two years have totaled approximately $90,000 annually with most of the surveys costing from $10,000 to $18,000. The Scientific Information Center does not issue publications regularly but it does publish and distribute the state-of-the-art studies that it has made.

As the organization chart of the Redstone Scientific Information Center indicates, it is a substantial organization with an authorized strength of 45 positions. Every employee of the Army Missile Command and the Marshall Space Flight Center and their contractors may use the resources of the Information Center, which at present include approxiamtely 135,000 volumes, more than 2,400 serials, and over 1,000,000 documents including a large file of microfiche containing the reports in particular of NASA, the Defense Documentation Center, and the Atomic Energy Commission.

Summary

The Redstone Scientific Information Center is still another means of facilitating use of a very large body of information by groups of scientists. While a majority of its staff members are trained in library science, the Information Center is much more than a traditional library under another name. It was designed and functions as one kind of total information operation and its Information Research Branch gives the Information Center much greater capacity than a traditional library. In the opinion of the present Director of the Center, a more accurate name for the organization might be "Redstone Scientific Information Facility." This statement is based in large part on the fact that the Information Center includes an Information Research Branch.

In the terms of this survey perhaps the primary significance of the Redstone Scientific Information Center is that neither the Army Missile Command nor the Space Center has established a separate information evaluation center with a consequent division of information responsibilities as in most of the other agencies studied. The Redstone approach has been to utilize the data resources and evaluations of other organizations and to give its Scientific Information Center a special means--its Information Research Branch--to facilitate the process. Apparently, the Redstone Scientific Information Center has been able to meet the needs of the Missile Command and the Space Center without organizational conflict or exceptional cost.

VI. PLASTICS TECHNICAL EVALUATION CENTER
PICATINNY ARSENAL
U.S. DEPARTMENT OF THE ARMY

The headquarters of the U.S. Army Munitions Command is located at the Picatinny Arsenal. The Command provides materiel and related services to the Army, to Army elements of unified commands and specified commands and to other United States and foreign agencies as directed. The principal activities of the U.S. Army Materiel Command include research; development; product, production and maintenance engineering; testing and evaluation of materiel; production and procurement of materiel; inventory management; and storage and distribution, maintenance, transportation, and disposal of materiel. The Picatinny Arsenal includes a large Plastics and Packaging Laboratory which is a component of one of its principal units, the Feltman Research Laboratories.

The Plastic Technical Evaluation Center (PLASTEC) is one of 22 specialized information analysis center monitored by the Department of Defense. The Center was established in 1960 as the Department's central source of information on properties and applications of plastics in defense, on project and contract activity and on personnel active in the field. PLASTEC serves the entire Department of Defense and also makes its services available to other governmen. agencies, their contractors and suppliers, libraries and universities.

The Department of Defense assigned the Army responsibility for the operation of PLASTEC which was located in the Picatinny Arsenal. This location enables the staff of PLASTEC to utilize the talents available in the large Plastics and Packaging Laboratory of the Arsenal. From this position, PLASTEC has developed as the Government's principal organization for the collection, evaluation and dissemination of technical information in the field. The Center has concentrated on four areas: reinforced plastics, plastics and electronic applications, plastics in packaging and plastics in mechanical goods. The Center expects to extend its coverage to the entire plastics and polymer field. The Director of the Plastics Technical Evaluation Center reports to the Chief of the Materiels Engineering Division of the Feltman Research Laboratory.

The Scientific and Technical Information Branch of the Plans and Programs Division, Feltman Research Laboratory, also is of primary interest in this study as it provides library and other information services to the Arsenal and other organizations including PLASTEC, the U.S. Army Munitions Command Headquarters, DOD contractors, and Army Munitions Command Project and Product Managers.

The objectives of PLASTEC are to collect, evaluate and disseminate information. Evaluation, in the opinion of its chief, gives the organization its essential character. It has attempted, for example, to give personnel of the Department of Defense technical and scientific community answers to specific technical questions instead of lists of documents. This activity, in its opinion, distinguishes it from documentation centers and libraries whose functions it believes are primarily the handling

of books and documents. With each answer to a specific inquiry PLASTEC attempts to provide a summary of the amount of work that has been done in the field, the present programs underway, the personnel engaged in the projects, the meaningfulness of the test methods and corroboration of data from other sources.

The output of PLASTEC includes providing answers to specific inquiries through correspondence, publications and the participation of specialists in meetings and symposia.

From 1960 to July, 1969, PLASTEC answered 1,670 requests for technical information. These requests were inquiries from outside the Arsenal for which a written record was prepared. The Chief of PLASTEC estimated that he receives an internal Arsenal question for every one received from the outside. He also estimated that unrecorded telephone inquiries in the period of 1960-69 probably totaled several times the number of written requests.

In the period 1960-69, PLASTEC issued 68 publications including Reports and Notes. PLASTEC Reports include state-of-the-art surveys, memoranda, data compilations, guides and directories. Information supplied by DDC and CFSTI shows that the two most requested reports were those containing hard data, specifically properties of materials. The Clearinghouse sold 450 and 600 copies respectively of these "properties" reports while DDC distributed 590 and 575 copies of them. Much used Reports are ones on government specifications on plastics, government personnel in the field, the "glossary of terms" and the annual bibliography of conference papers. PLASTEC Notes contain information on a particular phase of a subject and do not include narrative evaluation. Annotated bibliographies are part of the Note Series. The total copies of publications distributed was 58,000 to 1,150 individuals. PLASTEC occasionally prepares special reports at the direct request of ODDRE or the Army Materiel Command. Examples are *Structural Plastics in Aircraft* and a study in progress of the potential of plastic composites for the vibration damping in aircraft. These special reports are of very limited distribution. In addition, PLASTEC had 1,400 visitors requesting information and its staff made 920 technical trips.

The information base of the PLASTEC programs is composed very largely of reports of government-sponsored work and technical conference papers although the organization attempts to make its coverage worldwide. In collecting information the Center uses several techniques. First, personal contact by members of the staff with possible sources. By attendance at various meetings and symposia and by periodic visits to government laboratories, contractors, suppliers, fabricators, and processors they are able to keep abreast of new developments in plastics research, development, manufacturing, and testing. Second, PLASTEC receives automatically the reports produced by the research programs of both government and private industry. Such publications as *Chemical Abstracts* and those of NASA and the Defense Documentation Center are heavily used. Finally, house organs, trade publications and periodicals are regularly scanned.

The data base of the Center is maintained in its Library which at present holds approximately 14,000 documents for the exclusive use of the PLASTEC staff. It is to be noted that PLASTEC's Library is independent of the Scientific and Technical Information Branch of the Arsenal and is directed by a trained librarian who has a master's degree in library science. The Chief of the Center believes that the organization requires a library of its own in order that the indexing and abstracting may be geared specifically to its needs and to guarantee the immediate availability of reports. The Arsenal Library, he noted, lends reports to 2,000 engineers and scientists. The PLASTEC Library has developed a dictionary of indexing terms according to the use patterns of the organization's materials specialists. The current Plastics Technical Evaluation Center organization chart is Table VI-1.

The evaluation processes of PLASTEC include first the selection of information for its files. The material selected is indexed and abstracted by contract. The processes of evaluation also include review and cross-checking to arrive at the most likely values and most reliable interpretations. PLASTEC has no laboratory facilities but relies on the services of the Plastics and Packaging Laboratory and contact with other experts in the field in verifying information for its reports.

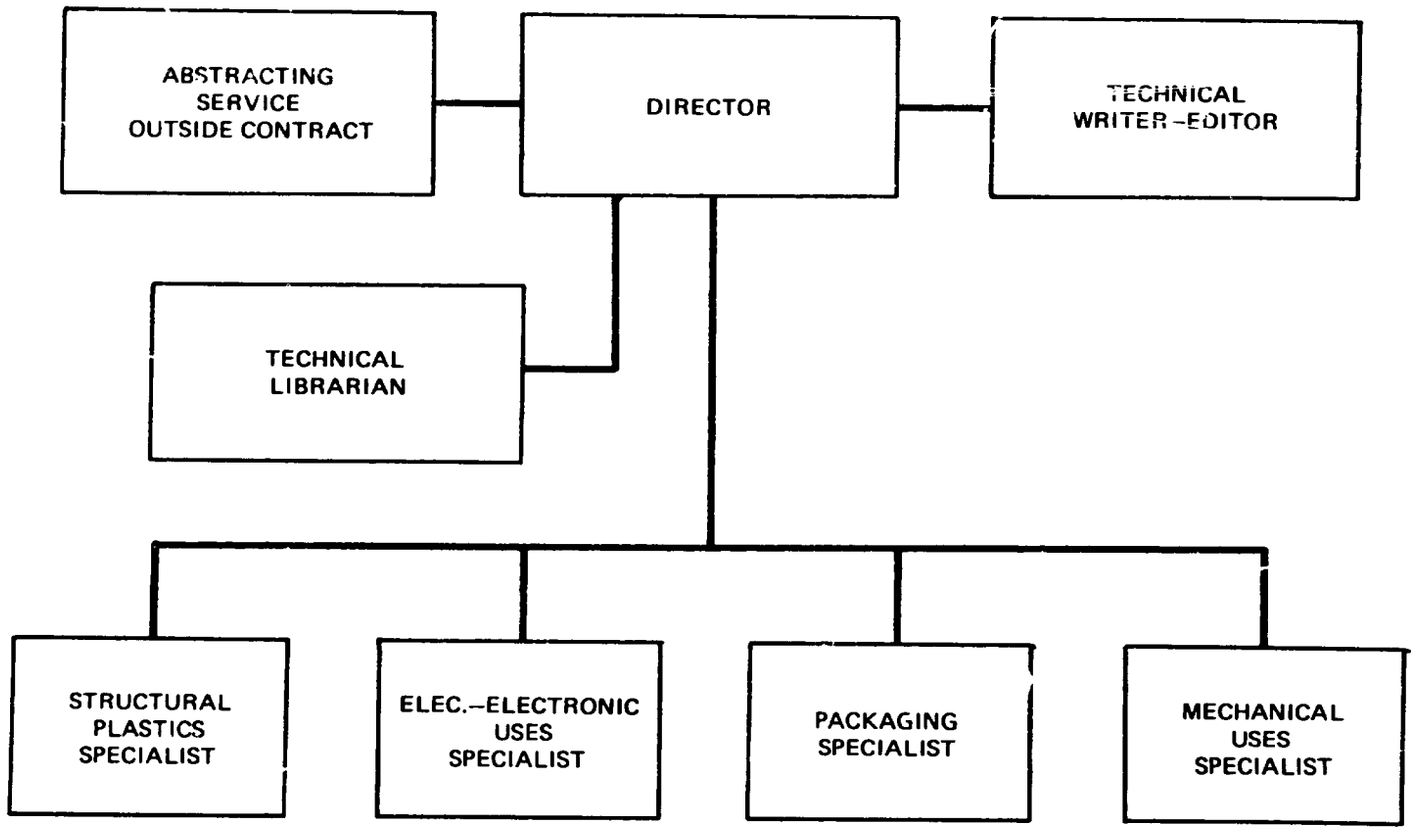
The Plastics Technical Evaluation Center has been developed on the assumption that it could perform it mission only with a staff of specialists in its field of activity. In the opinion of the Chief of the Center it is these specialists, with many years of experience and good professional reputations, who make it possible for the Center to meet its responsibilities. The present staff was selected to cover the particular areas of PLASTEC's programs--reenforced plastics, plastics and electronic applications, plastics in packaging and plastics in mechanical goods. The title of PLASTEC's professional staff members is "Materials Engineers" and they do not consider themselves either information technicians or librarians. No one on the staff other than the technical librarian has been trained in library methods. The average staff age is 52 and the members have approximately 20 years of experience in their fields.

The professional staff of PLASTEC includes nine positions with four supporting positions. The staff is supplemented by the consulting services of the Plastics and Packaging Laboratory with a staff of about 25 professionals and the contract services which are equal to two or three full-time staff members.

The professional staff members by fields of training are as follows:

Chemical engineer and management (Chief)
Chemical engineer (2)
Chemistry
Electrical engineer
Mechanical engineer
Library Science
Economics
Publications

TABLE VI-1
DEPARTMENT OF DEFENSE
PLASTICS TECHNICAL EVALUATION CENTER
"PLASTEC"



Below is a copy of a job description for a position of GS-13 on the staff center. This staff gives the Plastics Evaluation Center the capacity to perform most of its work in-house in contrast to most DOD information centers which are contract based. A final note on the staff and one of significance, the professionals in PLASTEC are paid higher average salaries than the engineers in the Arsenal's laboratories and those of most members of the staff of the Arsenal's Scientific and Technical Information Branch.

The present budget of the Plastics Evaluation Center is $400,000 which includes the costs of printing and publishing and of contractor services.

JOB DESCRIPTION FOR MATERIALS ENGINEER (PLASTICS)
GS-13

JOB SUMMARY

1. RESPONSIBILITY: As a specialist in structural plastics, interprets, evaluates and disseminates current design data and all other technical information available in the entire field of structural plastics. Accumulates design data and uses data obtained through an abstracting service, utilizing all sources available nationally and where pertinent, abroad. Provides this consulting and advisory service as a major phase of the Plastics Technical Evaluation Center's responsibility to the Department of Defense for making this service available to all agencies of the DOD, NASA, AEC and their contractors, universities, and NATO allies where applicable.

JOB CONTROLS

2. SUPERVISORY: Receive administrative supervision from the Director or the Center relating to integration of this specialization with the overall operation of the Center; and informal review for technical working relationships with the other specialized functions of the Center, contractor for abstracting services and with all outside agencies.

MAJOR DUTIES

3. As a recognized specialist and authority in the field of structural plastics, employs the most effective means of acquiring, reviewing, extracing, abstracting, editing and collating data accruing from commercial publications, government

reports of all types, travel and visitation reports, consultations, foreign documents, and intelligence reports, contract proposals, and symposium proceedings. Typically, receives written request from a contractor or other agency for all technical information available on the use of a certain type of plastic. As a result of keeping informed of developments and trends in the field, knows if any and what information is available. Studies data and determines means of conveying the data depending upon the extent of the project and relationship to other current projects. Makes whatever contacts are necessary in surveying the field, contacting author of paper prepared on the subject, agencies engaged in research or manufacturing, to assure that the most current data is used including other developments which might have been made since the date of technical information on file. Visits manufacturers to obtain data on current state of development in this area of specialization and negotiates for use of data from the manufacturer. Maintains other contacts by telephone, correspondence, and cable to overseas sources where these means of communication are sufficient. Analyzes all data and determines significant elements for use in the specific project. Recognizes the significance of developments no matter how seemingly small in one case but may be of great importance in other applications. Makes reference to index of all R&D contracts in effect to determine the possible source of data for specific applications. Seeing that much valuable data has been discovered as a result of investigation and recognizing the value to others in other applications, takes the necessary steps to compile this data for use in the form of a formal technical memorandum for distribution to all agencies having use for this data.

4. Exercise a broad knowledge of all plastics, uses, materials available and processes, and a thorough knowledge of chemistry, electrical, mechanical and physical working properties, methods of fabrication, testing, applications both successful and unsuccessful in industry and government, theoretical possibilities, practical and economical limitations as applicable to both the organic or inorganic reinforcement and the plastic binder.

5. Maintains knowledge of the current state of the sciences by continual study of current literature, reports, and laboratory work throughout the world;

through attendance at meetings, seminars, and conferences devoted to this field; and through personal contact with prominent men in the field. As a result of this knowledge and ability, anticipates new areas of development activity and makes necessary adjustments to this phase of the PLASTEC program to insure adequate accumulation and dissemination of data. Advises DOD of areas requiring new or increased research and development activity based upon observation and analysis of present conditions, existing and future needs of designers as determined by long range programs of the various Defense agencies.

Performs other duties as assigned.

Scientific and Technical Information Branch

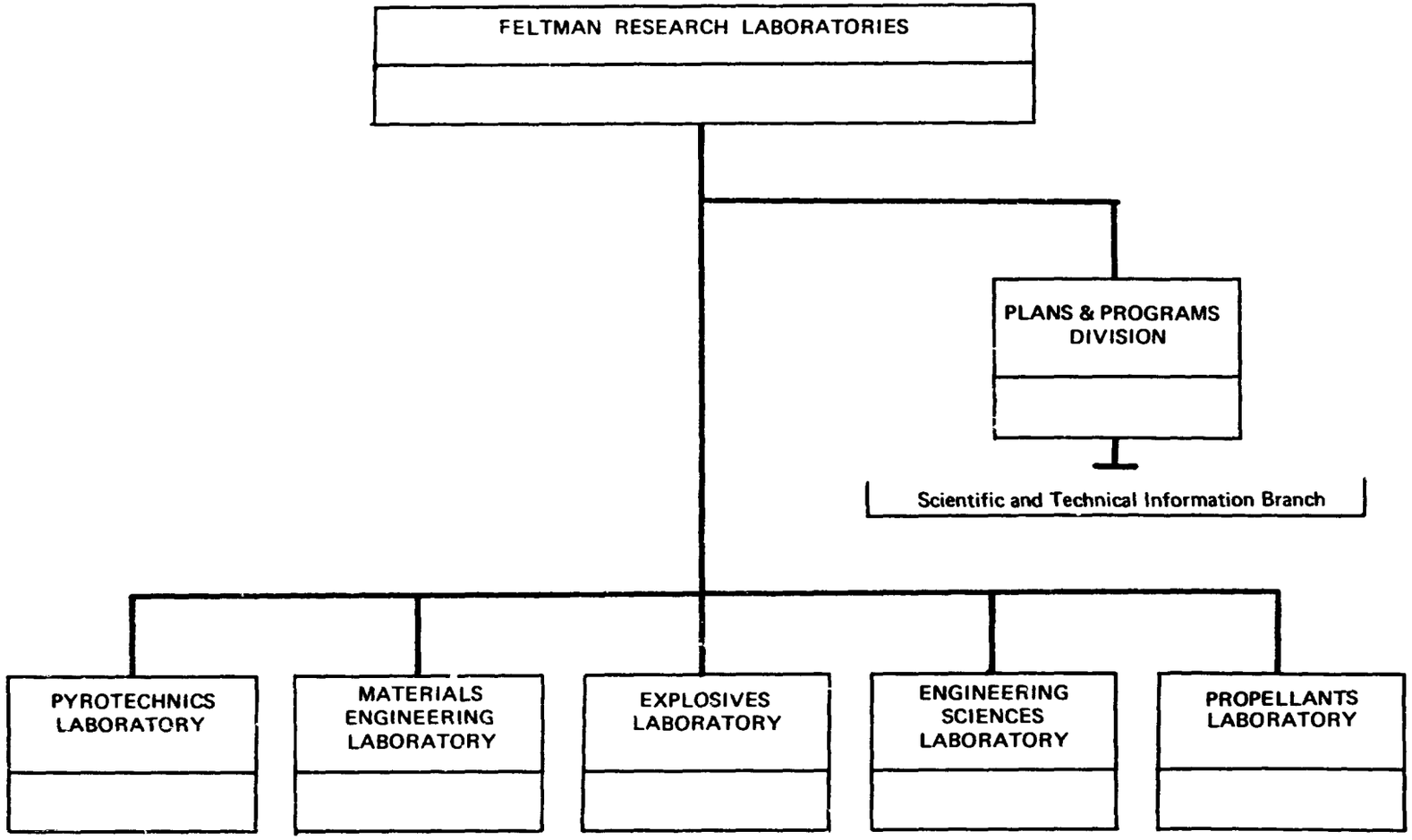
As noted above, the Arsenal includes a Scientific and Technical Information Branch which like the Plastics Technical Evaluation Center is located in the Feltman Research Laboratories although the two organizations report to different divisions in the Laboratory. The Scientific and Technical Information Branch serves the entire Arsenal and, as noted above, other organizations including the U.S. Army Munitions Command Headquarters, AMC Project and Product Managers and DOD Contractors. The organization chart of the Feltman Research Laboratories is presented in Table VI-2.

The general responsibilities of the Scientific and Technical Information Branch include:

- Planning, organization, coordination and direction of the technical library, technical publications and museum services for the Picatinny Arsenal.
- Research in the library and information sciences.
- Prescription of regulations and procedures for the preparation, abstracting and indexing of technical reports both in-house and by contractors.
- Liaison between the Defense Documentation Center and the Picatinny Arsenal.
- Selection, acquisition, processing and dissemination of scientific and technical information in support of the Arsenal's research and engineering mission.
- Staff supervision over the Arsenal's administrative management of technical reports.

The Scientific and Technical Information Branch included from 1957 to 1962 a Literature Research Section staffed by several chemists who conducted literature searches and prepared surveys and state-of-the-art reports. This activity was terminated in 1962 because of lack of staff support.

TABLE VI-2


FELTMAN RESEARCH LABORATORIES
PLANS & PROGRAMS DIVISION
Scientific and Technical Information Branch
PYROTECHNICS LABORATORY
MATERIALS ENGINEERING LABORATORY
EXPLOSIVES LABORATORY
ENGINEERING SCIENCES LABORATORY
PROPELLANTS LABORATORY

Organization charts of the Feltman Research Laboratories and the Scientific and Technical Information Branch are shown in Tables VI-2 and VI-3. The chart of the Branch does not require comment other than to note that the Technical Publications Section edits, prepares reproduction copy and distributes technical reports, technical memoranda, translations, articles and related publications. The operation of the Picatinny Arsenal museum is a somewhat unusual activity which involves the acquisition and display of U.S. and foreign munitions, the conduct of guided tours, orientation programs and the design of displays for various public services.

The Technical Processes Section, in addition to acquisition of books, periodicals and technical reports, maintains an archival collection of reports prepared at Picatinny Arsenal, operates the Arsenal's translation program and acts as a point of contact for special collections, including the Inter-Service Data Exchange Program and the Joint Atomic Weapons Technical Information Group Index.

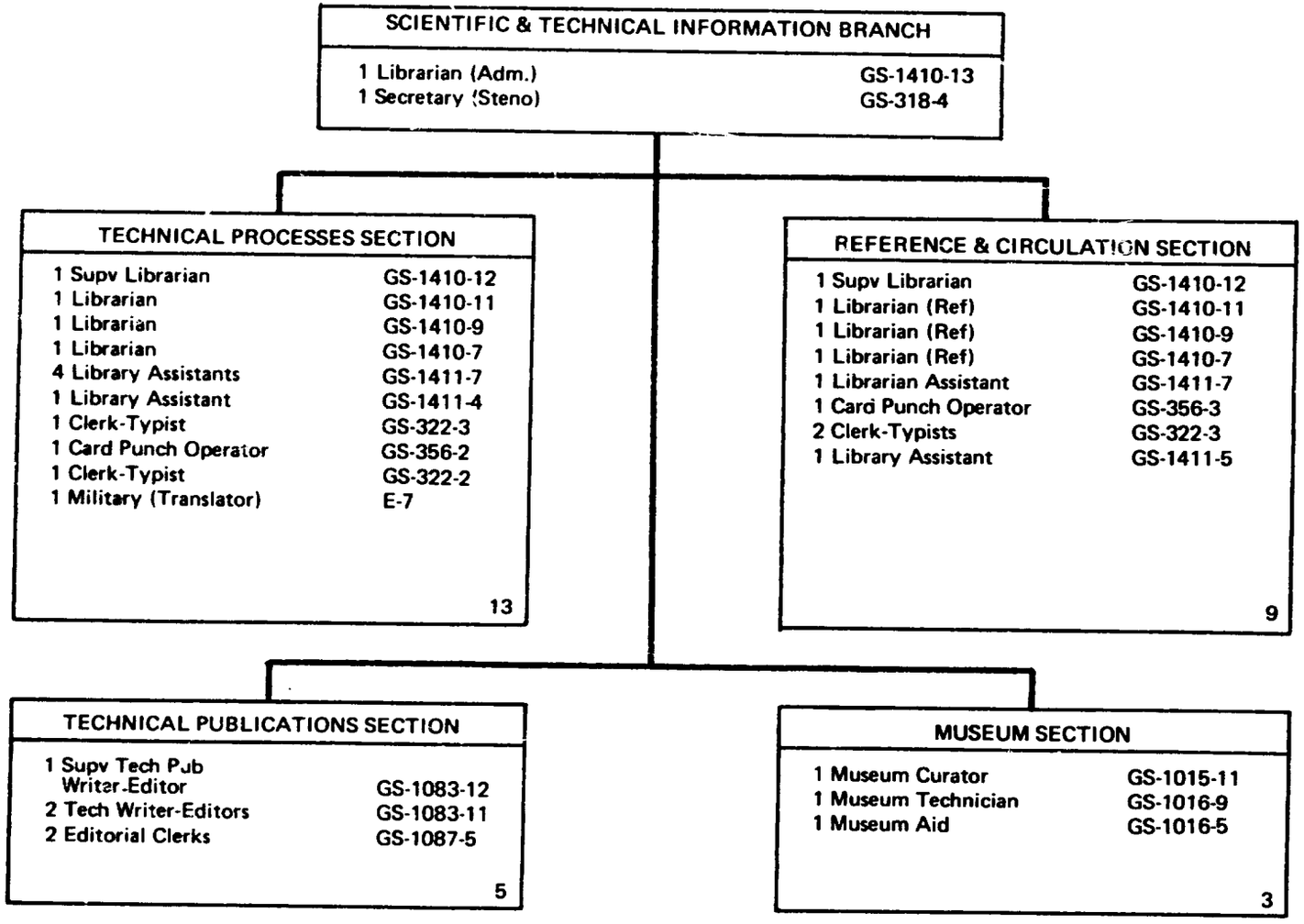
Although as indicated the Scientific and Technical Information Branch provides other substantial services to the Arsenal, its principal function is the operation of the Library. The Library is one of the largest in the Army with holdings that include approximately 50,000 volumes, 12,000 bound journals, and 50,000 microfiche. Established in 1929, the Library has grown steadily since that time and especially since 1949 when the present Chief of the Scientific and Technical Information Branch, a librarian, was appointed.

Relationship of PLASTEC and the Scientific and Technical Information Branch

Although PLASTEC and the Scientific and Technical Information Branch are components of the same unit of the Arsenal, they are administratively independent. In fact, there is a major difference in administrative status. PLASTEC, although located in the Picatinny Arsenal, was established to serve the entire Department of Defense. The primary mission of the Scientific and Technical Information Branch is to serve the Arsenal although it assists other organizations including PLASTEC, the U.S. Army Munitions Command Headquarters, AMC Project and Product Managers, DOD Contractors and other DOD activities requiring information available in its collection. There are some substantial interrelations between the two organizations. PLASTEC regards the Library of the Scientific and Technical Information Branch as a backup resource and also purchases books and periodicals through the Library.

In discussing the relations of PLASTEC and the Scientific and Technical Information Branch with their Chiefs, it was obvious that there was some difference of opinion about the validity of the present organizational arrangements. The present organization seems appropriate to the Chief of the Plastics Technical Evaluation Center. His organization, in his opinion, is engaged in creating information and to do so must be closely related to the laboratories that it serves. Second, the mission of PLASTEC, he believes, can be achieved only by specialists in its various program fields. Third, the Chief of PLASTEC does not believe

TABLE VI-3


SCIENTIFIC & TECHNICAL INFORMATION BRANCH
1 Librarian (Adm.) GS-1410-13
1 Secretary (Steno) GS-318-4
TECHNICAL PROCESSES SECTION
1 Supv Librarian GS-1410-12
1 Librarian GS-1410-11
1 Librarian GS-1410-9
1 Librarian GS-1410-7
4 Library Assistants GS-1411-7
1 Library Assistant GS-1411-4
1 Clerk-Typist GS-322-3
1 Card Punch Operator GS-356-2
1 Clerk-Typist GS-322-2
1 Military (Translator) E-7
13
REFERENCE & CIRCULATION SECTION
1 Supv Librarian GS-1410-12
1 Librarian (Ref) GS-1410-11
1 Librarian (Ref) GS-1410-9
1 Librarian (Ref) GS-1410-7
1 Librarian Assistant GS-1411-7
1 Card Punch Operator GS-356-3
2 Clerk-Typists GS-322-3
1 Library Assistant GS-1411-5
9
TECHNICAL PUBLICATIONS SECTION
1 Supv Tech Pub Writer-Editor GS-1083-12
2 Tech Writer-Editors GS-1083-11
2 Editorial Clerks GS-1087-5
5
MUSEUM SECTION
1 Museum Curator GS-1015-11
1 Museum Technician GS-1016-9
1 Museum Aid GS-1016-5
3

that engineers will accept information which is not produced by engineers or other persons trained in the plastics field. Fourth, while the PLASTEC Library may duplicate the Library of the Scientific and Technical Information Branch to some extent, the PLASTEC staff must have immediate access to the basic materials with which they work. Fifth, while the Chief of PLASTEC grants that his staff does engage to some extent in the traditional library functions of indexing and abstracting and publishing bibliographic matials, he believes that the partial utilization of a technical staff to perform these functions is better than attempting to create a staff of engineers and other technically trained persons in a Library which he does not believe is really feasible.

The Chief of the Scientific and Technical Information Branch did not question the functions performed by PLASTEC. However, he stated that he did not believe that the operation of PLASTEC independent of existing information activities was economically sound, and noted duplication of the holdings and activities of the Library of the Scientific and Technical Information Branch by the library of PLASTEC. The Chief of the Branch also emphasized that PLASTEC has a salary structure at least one grade higher on average than that of the Scientific and Technical Information Branch.

In response to a direct question, the Chief of the Scientific and Technical Information Branch stated that he believed that PLASTEC and the Library should be components of a total information center with equal administrative status. Within such an organization, he added, he believed that the present problems of duplication of holdings, review of publications and disparities in salary structure could be resolved with generally better coordination of both programs and resources. He agreed that an organization such as the Office for Information Programs of the National Bureau of Standards wa a good model for changes in the Picatinny situation.

Summary

The establishment of PLASTEC represents a decision by the Department of Defense on how to store and retrieve the great amount of literature produced in this country and in the world in one of its fields of major interest. The organization and administrative status of the Center are almost classic in the development of information analysis centers. It is DOD's policy to establish information analysis centers as adjuncts to organizations engaged in technical work. Thus PLASTEC is a part of the Feltman Research Laboratories. PLASTEC is independent of the Scientific and Technical Information Branch of Picatinny Arsenal. It is staffed almost entirely by non-librarians. It is engaged in the evaluation of technical materials and it does engage in certain traditional library functions. It has its own Library and it utilizes electronic data processing methods. In the opinion of the leadership of PLASTEC, information analysis centers and libraries are distinct but complementary organizations. To the Chief of the Scientific and Technical Information Branch, the functions of PLASTEC are needed by DOD but he believes that the existence of the organization independent of other information activities at the Arsenal is unsound.

VII. THE MEDICAL LITERATURE ANALYSIS AND RETRIEVAL SYSTEM (MEDLARS) NATIONAL LIBRARY OF MEDICINE

The National Library of Medicine is a large and complex organization with some unique responsibilities among Federal libraries. It is a remarkable library, and its development is of great significance to the other libraries of the National Government. The Library's history, which dates from 1836, has been so well documented that it is not necessary to summarize it in this report. The National Library of Medicine was studied in this project for two principal reasons. First, to determine why it was able to pioneer in the creation of computerized storage and retrieval systems. Second, to determine whether there are significant reasons for creating such a system within a library.

Before proceeding to discuss the two questions to which the study was directed, it is necessary to summarize the functions of the National Library of Medicine as background. The National Library of Medicine Act of 1956 transferred the Armed Forces Medical Library to the Public Health Service as the cornerstone of the new National Library. The Act prescribed certain specific functions for the Library:

- To acquire and preserve books, periodicals, prints, films, recordings, and other library materials pertaining to medicine;
- To organize these materials by appropriate cataloging, indexing and bibliographic listing;
- To publish and make available catalogs, indexes and bibliographies;
- To make available through loans, photographic or other copying procedures, or otherwise, such materials in the Library as it determines appropriate;
- To provide reference and research assistance.

In 1968 the Department of Health, Education, and Welfare in a reorganization transferred the National Library of Medicine to the National Institutes of Health, with the Director of NLM reporting to the Director of NIH. Since 1968, the Library has conducted five major programs:

1. Library Operations which include technical services, reference services, bibliographic services, the History of Medicine Division, and the Library Network Management Staff. The Library Network Management Staff is responsible for planning and managing the Biomedical Library Network which consists primarily of regional medical library services and MEDLARS programs which are the particular subject of this study.

2. Specialized Information Services. These services include the Toxicology Information Program which is a nationwide effort to improve the handling of toxicological information.

Preceding page blank

3. Audiovisual Programs which include the National Medical Audiovisual Center in Atlanta, Georgia.

4. Extramural Programs. The Medical Assistance Act of 1965 authorized a program of grants for the construction and exchange of medical library facilities, the improvement of library resources, the training of medical librarians and other health science information specialists, the conduct of research on the organization and dissemination of health sciences information, the support of biomedical scientific publications and the development of a national system of regional medical libraries.

5. Research and Development. This program includes research on information handling technology, the development of plans for a biomedical communications network and obtaining the contract services of university and industrial talent in solving biomedical communications problems.

This outline of major responsibilities indicates that the National Library of Medicine is a very large organization for the conduct of certain information activities. Its development is particularly significant as an indication of the implications of responsibility for comprehensive information services in a major field. A current organization chart of the National Library of Medicine is shown in Table VII-1. The size and strength of the National Library of Medicine is indicated by a few management statistics. In 1968, NLM had available for obligation $29,150,000. The principal obligations of these funds included $16,825,000 for grants with major allocations as follows:

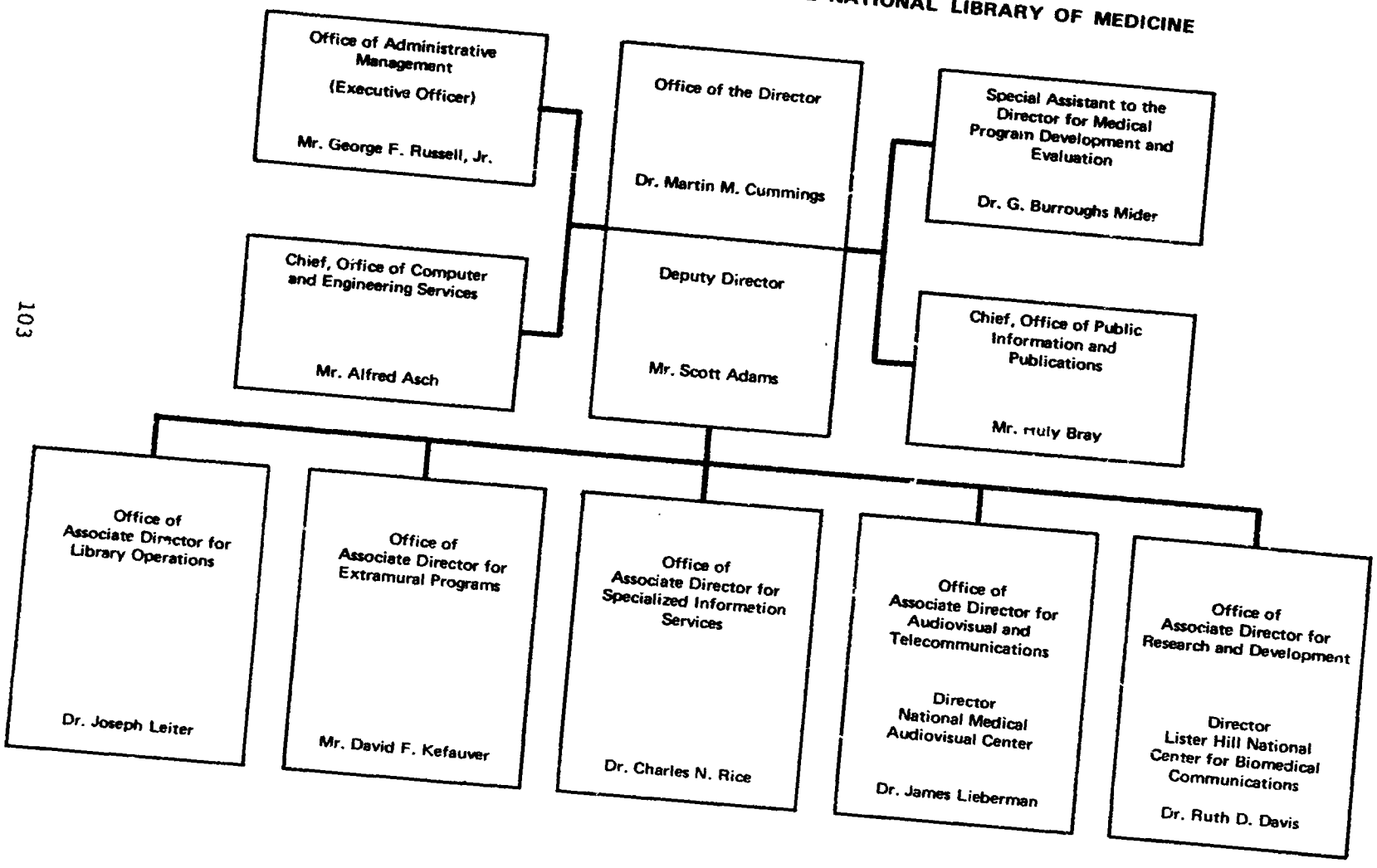
Construction	$10,000,000
Training	922,000
Research	1,261,000
Library Resources	3,537,000
Regional Medical Library	680,000

The allocation for direct operations included:

Library Operations	$ 5,777,000
National Medical Audiovisual Center	2,255,000
Toxicology Information	586,000
Research and Support Contracts	413,000
Review and Approval of Grants and Contracts	510,000
Program Direction	1,477,000

In fiscal 1968, the National Library of Medicine had 536 authorized positions of which 200 were in the Division of Library Operations, 127 in the National Medical Audiovisual Center, 35 in Extramural programs, and 50 in the present Division of Research and Development.

TABLE VII-1. ORGANIZATION CHART FOR THE NATIONAL LIBRARY OF MEDICINE



The Creation of MEDLARS

The National Library of Medicine created MEDLARS primarily to facilitate production of its basic publication, *Index Medicus*. The first volume of *Index Medicus* was published by the Library in 1879. This publication, which is of incalculable value to the medical profession of the United States and the world, was continued until 1927. It was replaced from 1927 to 1956 by the *Quarterly Cumulative Index Medicus* published by the American Medical Association. *Index Medicus* reappeared as a Library publication in 1960 replacing the monthly *Current List of Medical Literature*, which the Library had published since 1942.

When the decision to create MEDLARS was made, the preparation of the monthly *Index Medicus* had become a very large task. In 1961 the publication averaged 450 pages in length and contained references to more than 10,000 articles per average issue. In the same year a total of 140,000 items were indexed from 14,000 journal issues. It was estimated in that year that the annual total of items would reach 250,000 in 1969 with the journal issues expected to reach 25,000 in that year. In addition to *Index Medicus*, the Library published at that time one special recurring bibliography, *The Bibliography of Medical Reviews*, and produced various special bibliographies. It expected to expand the list of regularly published bibliographies to a total of 50 by 1964 and estimated that the nonrecurring demand bibliographies would reach a total of 2,500 in 1964 and 22,500 in 1969.

Until 1960 the preparation of *Index Medicus*, and its predecessor the *Current List of Medical Literature*, was a manual operation which increased in difficulty with the growth of the publication in physical size and scope. Successive efforts were made to deal with the problem of an ever increasing amount of literature. In 1950 a shingling technique, a method of manually arranging the publication entries in sequence for photographing, was adopted as a first step in the printing process. Shingling soon became a bottleneck and in 1960 a mechanized system was adopted. This system involved the use of tabulating cards on which citation information was typed by flexowriter and which were punched with machine readable sorting information. After machine sorting the cards were automatically photographed by an otep camera and the film cut into page arrangements for printing. This system was an improvement upon the previous one, but it was limited solely to the publications programs and could not meet the growing demands for rapid retrieval of complex requests. Thus the need was obvious for a system which would satisfy the increasing retrieval requirements and at the same time provide for the publication of *Index Medicus* and its byproducts.

The Medical Literature Analysis and Retrieval System, which was designed to enable the National Library of Medicine to achieve rapid bibliographic access to the Library's vast store of biomedical journal information, became operational in January 1964. The planning and development of the system required three years and about $3,000,000. The program is recorded in detail in "The MEDLARS Story at the National Library of Medicine," published by the Department of Health, Education, and Welfare in 1963 and in "MEDLARS, 1963-1967," by Charles Austin, published by the National Library of Medicine in 1968.

The principal objectives of MEDLARS, as stated in 1961, were to provide references to the biomedical literature to researchers, clinicians, and other health professionals by:

- Preparation of citations for publication in *Index Medicus* and *Current Catalog*.
- Preparation of recurring bibliographies in specialized subjects of wide interest (At present 15 such bibliographies are issued regularly).
- Preparation of retrospective one-time bibliographies.

In management terms, the objectives of MEDLARS were:

- To improve the quality and enlarge *Index Medicus* while at the same time reducing the time required to prepare the monthly edition for printing from 22 to 5 working days.
- To make possible the production of other compilations similar to *Index Medicus* in form and content.
- To make possible the production of special bibliographies (both demand and recurring) within a maximum of two days.
- To double the number of articles that could be handled annually.
- To reduce the need for duplicating the total literature screened.
- To keep statistics and perform analyses of its own operations in order to improve system effectiveness.

At present the National Library of Medicine receives approximately 20,000 different serial publications of all types. Some 7,000 of these are journals. The contents of approximately 2,300 biomedical journals are indexed for input into MEDLARS of which about forty percent are in foreign languages. The Library is assisted in the task of selecting the journals to be indexed by a Committee on Selection of Literature for MEDLARS, an external group of experts representing various medical specialties, medical librarians and medical editors. In August, 1969, the MEDLARS magnetic tapes contained about 1,000,000 citations to articles published since 1963. Approximately 220,000 citations are currently added each year.

As of January 1, 1968, approximately 90 people were required to operate and manage MEDLARS. Of this number, approximately 56 were professionals with 22 assigned to the Index Section, 11 to the Search Section, 6 to the Medical Subject Heading Section, 8 to the Computer Application Section, 5 to the Systems Analysis Section. In addition to this staff, other personnel in the library contribute importantly to MEDLARS in the selection and acquisition of books and journals, in research and development and in administrative services.

The MEDLARS system was designed to create a publications subsystem which produced, in 1968, 15 major publications. The MEDLARS publication subsystem is well known, particularly the MEDLARS photo-composer--GRACE. The pioneering work of this system has had a very large impact on the planning and conduct of information activities throughout the world.

In the planning of the MEDLARS system, one of the objectives was decentralization to provide local demand search service. Since 1964 the National Library of Medicine has contracted with universities to provide mechanized search services to users within stipulated regions as a means of multiplying the potential benefits of the system. By 1969, eleven universities or medical libraries cooperating in the system and the MEDLARS decentralization program had been extended to stations in the United Kingdom and Sweden.

Although the MEDLARS program succeeded notably, experience with it revealed additional problems as well as additional possibilities for improved services. Thus a contract for MEDLARS II was awarded in June, 1968. The development of a more powerful and sophisticated system is expected to require about four years.

The Particular Significance of MEDLARS

In the preceding pages the origin, development and present organization of MEDLARS has been sketched. As noted in the first paragraph of this report, MEDLARS was made the subject of a case study in this project to determine the significance of its creation and management for Federal libraries generally. This question has been considered particularly by Mr. Scott Adams, Deputy Director of the National Library of Medicine from 1960 to 1970, and was a principal subject of interviews with him and other administrators of the National Library of Medicine. To Mr. Adams, the unique aspect of MEDLARS is a "computer-based information retrieval system married to a large research library." This association, he believes, gives MEDLARS special significance for the future of both information science and of research libraries.

Most of the information systems that have been created in Federal agencies to deal with the great volumes of information generated by American research and development have been established outside established libraries and were conceived by scientists and engineers rather than librarians. MEDLARS, in distinction to these systems, was conceived by librarians in response to a library need and is founded on an understanding of indexing technology derived from eighty years of bibliographic experience with the literature it serves. Further, MEDLARS was developed in a library situation in which the power of retrieving citations was matched by the power of supplying textual information from the published literature. To Mr. Adams, it is this situation which gives MEDLARS its particular strength and significance to library development generally.

There are other special aspects of MEDLARS. Its files are among the largest of any system in the world, and it services them on behalf

of a very large scientific public. Second, it is a system that can retrieve information in a number of fields and repackage their products. Thus, it is not a "closed" system in the sense of serving the interests of a single government agency. Instead, it is an "open" system located in a national agency with broad responsibilities to the medical related professions of the U.S.

In discussing the meaning of MEDLARS to the library community, Mr. Adams stated, "The ultimate meaning of MEDLARS to the medical library community lies in its potential capacity to revitalize and redirect the library as an institution created and supported by society to provide information services. What lies ahead is not a revolution of automation, it is a renaissance of libraries."[1]

While Mr. Scott Adams has been quoted particularly in the paragraphs above, his opinions were substantiated in all of the interviews with NLM officers.

In summary, MEDLARS has been a successful operation since established in January 1964. It has effectively manipulated citations for the composition of published indexes including particularly *Index Medicus*. Second, it repackages citations to create specialized recurring bibliographies. And third, it performs mechanized retroactive searches of complex scientific subjects relating to medicine. It is a publishing system as well as a retrieval system and it is a citation system covering the published journal literature of the biomedical sciences. It is the means by which the National Library of Medicine discharges the indexing functions which had been discharged manually since 1879 when the original *Index Medicus* was initiated. MEDLARS has been the means of developing a national information system and has been widely acclaimed for its success. The question follows as to why the National Library of Medicine was able to create such a pioneering and widely acclaimed storage and retrieval system and to utilize it in the development of a national information network.

The following answers to this general question were derived from interviews with a majority of the members of the top staff of NLM. These men emphasized first the factor of institutional strength. NLM has, as noted above, several major missions. The organization is large; it has had exceptional financial resources; it has a large, highly trained and well-paid staff; and it has a national clientele which has supported its development.

The second factor cited was NLM's dual mission of bibliographic control and library services. In the opinion of its leaders, the publishing and indexing responsibilities were of primary importance in the Library's ability to pioneer in the use of methods of electronic data processing.

Third, the Library always has been user-oriented which has influenced the selection of staff in the sense that personnel was needed who could define user needs. Fourth, the orientation to its clientele has

produced in the Library an unusual degree of subject matter specialization which has helped to make the staff unusually dynamic in philosophy and action.

Finally, the type and quality of the leadership of NLM has had a profound effect on its philosophy and programs. It seems quite evident that the Library long has had exceptionally able leadership. At present, its top positions are filled by non-librarians including scientists, mathematicians, and science administrators. The non-librarians, however, are individuals who have very considerable competence in librarianship. And in their administration they seem to have utilized the career librarians in the organization effectively.

The effects of this leadership have been several. First, the leaders of NLM have been aggressive in developing new programs as witness the steady increase in its responsibilities since 1956. They have been able to determine the needs of the Library's clientele and to secure funds to create programs to meet them. The leadership has carried on a tradition of pioneering. Primary credit for the conception of MEDLARS was given by the interviewees to Dr. Frank B. Rogers, Director from 1950 to 1963, who had degrees in both medicine and library science.

The leadership of NLM is interdisciplinary, which has enabled it to accept easily new developments in information methods and in science generally. The leaders as a group have had an information science orientation which has resulted in EDP training being given to much of the staff in reference, cataloging and indexing work.

Summary

The cornerstone of the National Library of Medicine is its collection and the various services which are based upon it. However, the Library has attempted to reinterpret the traditional functions of a national library and, in the opinion of its leaders, been made increasingly useful. The interviewees agreed that while libraries have serious problems and deficiencies, they are the better base for development of information systems. In NLM information science has been, in the opinion of its leaders, married to librarianship with satisfactory results for both groups of specialists and for its clientele. The result has been an organization that has and is playing a very active and important role in the health programs of the country and one in which the librarians have received exceptional status and opportunities. While the interviewees agreed that "information sytem" probably was a better organizational concept than "library," they did insist that information activities should be built on a library base.

FOOTNOTES

1. This discussion is based on interviews with Mr. Scott Adams, Deputy Director, National Library of Medicine, and upon his article, "MEDLARS and the Library Community." *Bulletin of the Medical Library Association*, Volume 52, Number 1, January 1964.

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY *(Corporate author)* The National Academy of Public Administration 1225 Connecticut Avenue, N.W. Washington, D.C. 20036	2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED 2b. GROUP

3. REPORT TITLE
Extra-Library Information Programs in Selected Federal Agencies

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*

5. AUTHOR(S) *(First name, middle initial, last name)*
O.B. Conaway, Jr.

6. REPORT DATE September 21, 1970	7a. TOTAL NO. OF PAGES 109	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO. b. PROJECT NO. 2P062107A728 c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) TISA 29 9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)*	

10. DISTRIBUTION STATEMENT
All technical libraries of the Department of Defense.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY U.S. Army Corps of Engineers

13. ABSTRACT

Information programs of seven Federal agencies were studied in order to: 1)determine how and why extra-library information storage, analysis, and retrieval systems have been established; 2)determine the place of information systems within the total structure; 3)determine functional, organizational, and operational relationships; 4)identify the common and unique functions of libraries and extra-library systems; 5) provide recommendations, guidance, and conclusions.

The agencies studied are National Aeronautics and Space Administration, Division of Scientific and Technical Information; National Standard Reference Data System; National Clearinghouse for Mental Health Information; Pesticides Information Center of the National Agricultural Library; Plastics Technical Evaluation Center of the Picatinny Arsenal, and Redstone Scientific Information Center.

DD FORM 1 NOV 68 1473 REPLACES DD FORM 1473, 1 JAN 64, WHICH IS OBSOLETE FOR ARMY USE.

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
ATLIS						
TISA						
Technical Libraries						
Technical Information Analysis Centers						
Information Programs						